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REFERRALS FROM THE COMMUNITY TO THE HOSPITAL EYE SERVICE

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Submitted for the degree of PhD

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ABSTRACT

Ophthalmic referrals to the outpatient (OPD) and accident and emergency departments (AED) of Moorfields Eye Hospital, London and the OPD of the Birmingham and Midland Eye Hospital were examined. Referral correspondence was analysed and Practitioners and Patients were questioned.

Over half the referrals to the OPD and three quarters AED referrals were generated by the patient's GP. The GP refers over 80% external eye conditions and about 50% cataract referrals received. Many GP referrals to AED were an inappropriate use of the emergency service.

Almost all routine community referrals were sent via the patient's GP. The added value of referring via the GP is low. This is acknowledged by GPs who frequently find onward referral an administrative burden. 96.8% GPs questioned felt some patients would benefit from direct referral. Only about 50% GPs add any information to the OO/OMP's referral of which only 25% give important general medical information. Up to 22% GPs did not include the initiating Ophthalmic Practitioners correspondence when forwarding the referral to the HES.

Ophthalmic practitioners referred over 80% glaucoma suspects. Their accuracy was not high with less than 50% glaucoma referrals being confirmed or high risk cases. Accuracy was higher when intra-ocular pressures were higher, when there was a greater difference in pressure between each eye, and when the patient was older.

New younger asymptomatic patients were less likely to attend their outpatients appointment. The main reasons were that the patient claimed to have already cancelled the appointment (25%) or that he/she had not received the appointment notification (16%). The likelihood of failing to attend was not related to the referral process.

GLOSSARY

Abbreviations

A/C	Anterior Chamber
AED	Accident and Emergency Department
AOP	Association of Optometrists
Accom.	Accommodation
Ams.	Amsler Chart
BCO	British College of Optometrists - In January 1996 the BCO became The College of Optometrists (COptom)
Bg	Background
BD8	Blind and Partially Sighted Registration Form
Bin.	Binocular
BMEH	Birmingham and Midland Eye Hospital
BMA	British Medical Association
BP	Blood Pressure
BV	Binocular Vision
CAPI	Computer Aided Personal Interview
CEB	Community Eye Clinic, St Andrews Hospital, Bow
CET	Continuing Education and Training
Cat.	Cataract
CO	Casualty Officer
COptom	The College of Optometrists (Formerly the British College of Optometrists)
CSAG	Clinical Standards Advisory Group
DHA	District Health Authority
DHSS	Department of Health and Social Security - the department was divided in 1988.
DNA	Did not attend
DO	Dispensing Optician
DOH	Department of Health - Formed in 1988
enc.	Enclosed
ECR	Extracontractual referral
EOM	Extraocular Muscles

Abbreviations

FH	Family History (Medical)
FHSA	Family Health Services Authority
FPC	Family Practitioner Committee
GH	General Health
GOH	General Ocular History
GOS	General Ophthalmic Service
GP	General Medical Practitioner
GPFH	General Practice Fundholders
H/A	Headache
HES	Hospital Eye Service
Hg	Mercury
IOP	Intra Ocular Pressure
k's	Keratometry Readings
Med	Medication
MEH	Moorfields Eye Hospital
mono	Monocular
NHS	National Health Service
NPC	Near Point of Convergence
OO	Optometrist or Ophthalmic Optician
OMP	Ophthalmic Medical Practitioner
OPCS	Office of Population Censuses and Surveys
PAPI	Paper and pencil interview
PCC	Primary Care Clinic, Moorfields Eye Hospital, London
PH	Pinhole
PMH	Previous Medical History
POAG	Primary Open Angle Glaucoma
Qu.	Question
RHA	Regional Health Authority
ROH	Recent Ocular History
RCOphth.	Royal College of Ophthalmology

Abbreviations

Rx	Refraction
SR	Self Referral
V	Vision - Snellen Acuity recorded without spectacles
VA	Visual Acuity - Snellen Acuity recorded with best refraction in place
VACh	Change in Visual Acuity
VAD	Visual Acuity - Distance
VAN	Visual Acuity - Near

Symbols

α	Threshold probability level for rejecting H_0
χ^2	Chi-square
df	degrees of freedom
Mdn	median
N	total number of scores
p	probability
r	Pearsons product moment correlation coefficient
s	standard deviation of a sample, estimate of a population standard deviation
$s_{\bar{x}}$	estimated standard error of the mean
t	student's statistic
X	variable (raw scores)
$\bar{x}$	mean

Definitions

Designated Referral	Referral correspondence addressed to a named Consultant
Dispensing Optician (DO)	a practitioner who dispenses spectacles. Some DOs are qualified to fit contact lenses.
NHS Trust	An NHS Trust is a unit run by a Board of Directors independent of health authority management. The Trust is part of the NHS and is directly accountable to Ministers via the NHS Executive.

Non-Designated Referral	Referral correspondence not addressed to a named Consultant
Ophthalmic Medical Practitioner (OMP)	a registered medical practitioner approved by the Ophthalmic Qualifications Committee. An OMP usually holds a specialist qualification in ophthalmology and has at least 2 years experience in hospital-based ophthalmology.
Optometrist (Ophthalmic Optician - OO)	a non medical practitioner who is qualified to test sight and identify abnormalities affecting the eyes.

REFERRALS FROM THE COMMUNITY TO THE HOSPITAL EYE SERVICE

1. INTRODUCTION

The general medical practitioner (GP) undertakes a primary health care role, directly accessible to the patient. Referral of a patient to a hospital consultant offers the GP access to care which is usually more specialised than can be provided within the primary sector. Controlled access to the secondary health sector (hospital care) allows the GP to maintain scrutiny of the treatment received by his/her patients. It is felt to be fundamental to the smooth running of the National Health Service (NHS) in the United Kingdom.

Ophthalmology, unlike other medical disciplines, has a referral process that often involves an additional referral tier. Within the primary care sector, an Optometrist (OO) or Ophthalmic Medical Practitioner (OMP) refers their patient to the GP. It is the patient's GP who decides whether referral to the hospital eye service (HES) is required. This allows both the ophthalmic practitioner and the GP to report on the patient's ocular and general health.

The NHS Referral Process

The History of the Referral Process

Even before the formation of the National Health Service in 1948 the referral process was well established. The National Health Insurance Act of 1911 ensured that the GP received a capitation fee for a group of patients. The Act provided for the working poor and not their dependants. Payments were made to the GP whether or not the patient was seen for an examination. Specialist opinions were free of charge and it was not detrimental to the GP's income to refer a difficult case for more expert opinion. The standard of health care for the insured person was therefore greatly improved.

The implementation in 1948 of the National Health Service Act 1946 provided free medical, dental, ophthalmic, pharmaceutical and other ancillary services to the entire population. The Primary Care Providers were accessible to the public, and secondary care was available to patients referred by their GP. Direct access to NHS hospital facilities was only available to patients in an emergency. This restriction of access has remained with few exceptions eg. genitourinary clinics.

By controlling access to secondary care many costs incurred by other health services

across Europe have been defrayed (Fleming 1992; Ham 1992). In recent years the change to a more primary care led NHS (Tomlinson, 1992) has placed greater responsibility for the continuing care of patients with the GP. By transferring some care to their GP, the specialist is able to deal with more appropriate patients (Horder, 1985). Care of the chronically sick is also effectively provided by sharing care between the primary and secondary care services. The GP can monitor the stable patient, referring to the specialist as required.

Referral rates

The Royal Commission on the NHS 1979 stated that, "the capacity of health services to absorb resources is almost unlimited." The Commission explained that priorities have to be set and choices made between services eg. Cambridge Health Authority refused to fund chemotherapy and a bone marrow transplant for 'Child B' (Hall, 1995). Government department spending reviews have meant that all aspects of health expenditure have been reassessed.

Patients do not have an automatic right to referral. Under the National Health Service (General Medical Services) Regulations 1992 SI 1992/635 the GP is required to refer patients 'as appropriate, for the provision of any other services under the Act.' This fact is emphasised by the Patient's Charter (DOH, 1995) which states that referral will be made only when the "GP thinks it necessary".

GP referral rates show substantial variation (Crombie and Fleming 1988; De Marco et al, 1993; Fertig et al, 1993; Jones 1987; Moore and Roland, 1989; Wilkin and Smith, 1987) and differences are still pronounced when population age and distribution are taken into account (Crombie and Fleming 1988). For example, the elderly are heavy users of health services (Ham 1991) though Jones (1987) could find no statistical correlation between practices with a high proportion of elderly on their lists and their hospital outpatients' referral rate.

Variability in referral rates has obvious funding implications. The Government White Paper, Promoting Better Health (DHSS, 1987) stated that,

"It is important that expensive hospital facilities are used in the most cost effective way, and the wide variation in referral rates suggests that this may not always be the case."

Clearly if referrals are to be assessed the definition of what is an appropriate referral needs to be addressed. Such definitions are not straightforward and the following aspects need to be considered:

- The referring doctor, the patient and the Consultant all tend to have different expectations about a given referral (Grace and Armstrong, 1987). The patient's judgement is rarely considered when the appropriateness of a referral is being assessed (Roland, 1992a).
- The appropriateness of the referral needs to relate to the reason for referral. Grace and Armstrong (1986) identified that poor communication and understanding about the reasons for referrals between the GPs and hospital Consultants may be limiting their usefulness.
- There may be a difference between the medical decision about the appropriateness of a referral and the view of society as to the appropriate use of health service resources eg. Cosmetic surgery, gender changes etc. These differing views will affect whether or not the referral is felt to be appropriate.

Roland (1992a) identifies that without reference to a "standard" of what constitutes an appropriate referral, an assessment of whether or not a referral should have been made is difficult to judge.

Various studies have looked at the appropriateness of referrals. Knottnerus et al (1990) conducted a comparative study of referrals by GPs with high and average referral rates. Appropriateness was assessed by an independent expert panel. No difference was found between the appropriateness of referrals even accounting for the age, sex and repeat referrals. Practices with higher referral rates also have higher admission rates that suggest that these referrals are appropriate (Coulter et al, 1990). Numerical monitoring that treats all decisions on referrals as essentially similar is too simplistic (Coulter et al, 1989) and higher referral rates do not automatically indicate inappropriate referrals (Reynolds et al, 1991). A small number of inappropriate GP referrals, as judged by hospital consultants, were identified in a Cambridge study (Fertig et al, 1993). This group was not large enough to explain the large variation in referral rates among the GPs. De Marco et al (1993) found that GPs do not accept that rates of referral and quality of clinical practice are linked. The evidence appears to support this view.

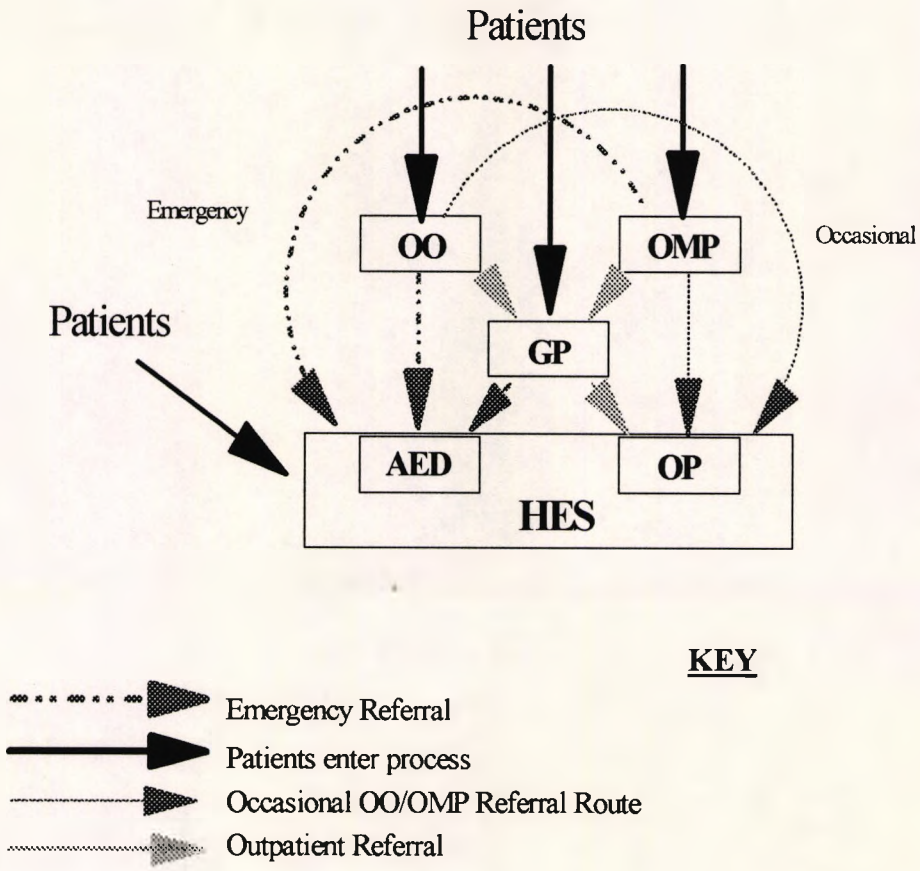
Various studies have offered reasons for this variability but results have been inconsistent or inconclusive (Wilkin and Smith; 1987). Referral rates were lower when the distance to the hospital increased (Jones, 1987) and GPs interviewed felt that hospital access affected their referral decisions (De Marco et al, 1993). The skill of the individual GP was also felt important; referral rates have been shown to increase with specialist knowledge (De Marco et al, 1993; Reynolds et al, 1991).

GPs who feel they are placed under higher pressure from their patients seeking referral have higher referral rates (Armstrong et al 1991). This pressure may increase as patients become increasingly aware of their rights as consumers (DOH, 1995).

The Ophthalmic Referral - A Special Case

Most referrals to the HES are initiated by the patient's GP (Harrison et al, 1988; Lee et al, 1992). OOs and OMPs also generate HES referrals but patients are directed via the GP. Only in an emergency can these professionals refer directly to the HES (Figure 1.1). Hospital medical staff, community medical officers, dispensing opticians (DOs), orthoptists, and occupational doctors and nurses also refer patients to the HES (Harrison et al, 1988; Lee et al, 1992). Except for hospital doctors, who accounted for a large proportion in one study (Lee at al, 1992), the other groups refer only a small percentage of patients.

Figure 1.1. Referrals to The Hospital Eye Service



The Role of the Ophthalmic Practitioner

Eye examinations are conducted by either an OO or OMP (Opticians Act, 1989). An OO is a non medical practitioner who is qualified to test sight and identify abnormalities affecting the eyes. He or she must be registered with The General Optical Council (GOC) under legislation first introduced in the Opticians Act (1958).

OMPs are registered medical practitioners approved by the Ophthalmic Qualifications Committee. This committee is organised on behalf of the DOH by the British Medical Association (BMA) and membership includes representatives from the BMA's Ophthalmic Committee and the Royal College of Ophthalmologists (RCOphth). Usually an OMP holds a specialist qualification in ophthalmology and has at least 2 years experience in hospital-based ophthalmology (NHS (GOS) Regulations, 1986).

Under the National Health Service Act (1946) eye care was provided by the Supplementary Ophthalmic Service. It was intended that the service would become part of the HES, but eventually the Health Service and Public Health Act 1968 recognised that a hospital setting was not feasible. This Act renamed the utility the General Ophthalmic Service (GOS). Local lists of service providers contracted under National Health Service (General Ophthalmic Service) Regulations (SI 1974/287) were compiled by Family Practitioner Committees (FPCs). All OOs and OMPs could apply to provide GOS services in their area. FPCs were renamed Family Health Services Authorities (FHSAs) under the NHS and Community Care Act 1990. The new authorities continued to administer services but with extended planning, development and monitoring roles. FHSAs have now merged with District Health Authorities to become joint Authorities under the Health Authorities Act 1995 implemented on 1st April 1996.

Under the Health and Medicines Act 1988 the universal provision of NHS eye examinations, within the GOS, was curtailed. Only patients on reduced incomes, diabetic or glaucoma sufferers, registered blind and partially sighted patients, patients with complex prescriptions or first order relatives of glaucoma sufferers are now eligible. 53% eye examinations are now private transactions (Federation of Ophthalmic and Dispensing Opticians, 1995). NHS (GOS) SI 1986/975 modified with SI 1989/1175 The NHS (GOS) Amendment (No.2) Regulations 1989 requires the practitioner to inform a patient's doctor if on examination:

- There appear to be signs of injury, disease or abnormality in the eye or elsewhere which may require medical treatment.
- A satisfactory standard of vision is unlikely to be attained even with corrective

lenses.

The doctor must also be informed of the results of the examination if the patient is a diabetic or glaucoma sufferer. These rules apply to both OOs and OMPs conducting GOS eye examinations.

The Opticians Act 1989 governs all eye examinations and replaced the Opticians Act 1958. SI 1989/1230 The Sight Testing (Examination and Prescription)(No2) Regulations 1989 made under the Act (section 26(1)) require the OO/OMP to perform examinations "for the purpose of detecting signs of injury, disease or abnormality in the eye or elsewhere". If detected, the GOC (Rules relating to injury or diseases of the Eye) Order of Council 1960 oblige the OO (the rules do not apply to the OMP) to refer the patient to a medical practitioner. Legally the duty to *refer* a patient places a greater responsibility on the OO than the GOS contract requiring the patient's doctor to be *informed.*

95% OOs within the UK are members or fellows of The College of Optometrists (COptom). This body has guidelines for professional conduct that the GOC uses as the 'peer view' in cases of alleged serious professional misconduct (COptom, 1991). Referrals made by the OO must "operate in the best possible interests of the patients". The guidelines stress the need to keep the GP informed in the early stages of eye disease if only further monitoring is required, and if an urgent case has been referred directly to the HES. The proportion of patients referred by optometric practitioners has been analysed in a number of studies (Table 1.1).

Table 1.1. Rates of OO/OMP Referral to the GPs

Study	Practitioner(s)	N	% ref
Claoué (1988)	1 OMP	500	5.0
Hobley et al (1992)*	74 randomly selected UK OOs	13,107	2.86
Port and Pope (1988)	1031 OOs (members or fellows of COptom)	52,123	4.2
Port (1989)	1561 OOs (members or fellows of COptom)	74,710	6.05

*** retrospective study**

The OO and OMP are ideally qualified to undertake some delegated care of ophthalmic patients within the primary care sector (AOP, 1994). Such schemes are frequently referred to as "shared care". Patients who would normally have received follow-up appointments within a hospital setting are beginning to be monitored by their ophthalmic

practitioner. Such schemes, with strict referral and management protocols, may provide an equivalent standard of care to patients in this way (AOP, 1994; Burn-Cox and Dean Hart, 1985; Gatling et al, 1995).

The Role of the GP

Many patients consult their GP directly with ocular symptoms or visible ocular signs. As in 1948, the service is free at the point of need and is easily accessible. The GP controls patient access to the hospital system and it is based upon his/her judgement whether OO/OMP referrals are referred to the HES.

Many referrals from OO/OMPs to the patient's GP will not require hospital referral. Evidence of systemic hypertension or diabetes may be observed during retinal examination and the patient's GP will be able to monitor these conditions. GPs can also prescribe treatment for external ocular disorders eg. conjunctivitis, blepharitis or dry eyes. In other disorders the GP may delay referral or monitor the condition eg. early cataract. 82% ophthalmic patients referred to Perkins (1990) were referred on to the HES.

Brittain (1988) outlined the importance of maintaining this referral path. It allows the GP to control decisions made on behalf of the patient and to identify associated risk factors. This referral pathway is "practical and efficient" (RCOphth, 1995). The inclusion by the GP of the patient's medical and drug history enhance the results given by the OO/OMP (Duke, 1986). However only one third (Jones et al, 1990) to half (Kljakovic et al, 1985) of all OO/OMP referrals contained additional patient information from the GP. Cases have also been identified where patients referred to the GP with a high risk of glaucoma were not referred on to the HES (Tuck and Crick, 1991).

The Role of the HES

Consultant Ophthalmologists rely on the information within the referral letter to identify the priority of the referral (Curran, 1992; Moorfields Eye Hospital, 1992; Harrison et al, 1988; Talks et al, 1995). Where waiting times are long, inaccurate diagnosis or inadequate information in referral correspondence can place patients with sight threatening conditions at risk.

Lee et al (1992) identified an incorrect diagnosis in one third of referrals. 10% patients on their waiting list were at risk of developing irreversible visual loss, and it was concluded that giving patients priority on the basis of their referral letter is unsound. The Primary Care Clinic in Warrington has eliminated this problem by dramatically reducing

waiting times (Peckar et al, 1994); patients are offered appointments in less than one week.

57.4% of new ophthalmic patients seen at the Primary Care Clinic of MEH are treated and discharged after one appointment (MEH, 1993a). The Warrington Clinic (Peckar et al, 1994) discharges fewer patients; 41% patients were discharged from the clinic although it is unclear whether follow-up appointments were included. All GPs in both areas receive replies following patient attendance. The Warrington Clinic also forward copies of this correspondence to any OO associated with the referral.

Ophthalmic Referral Correspondence

The GOS18 is the standard GOS referral form (England and Wales). In April 1993 a new version of the form was produced by the Department of Health for distribution by FHSAs. Use of the form is discretionary.

The original form, often referred to as the 'green form,' comprised three sections (Appendix Ia). Patient details, and ophthalmic practitioner examination findings and comments, were followed by the GP's remarks. The final section allowed the GP or the Ophthalmologist to refer the patient back to the OO/OMP or inform him/her of the outcome.

The latest version of this form comprises 4 self carbonating pages (Appendix Ib). The OO/OMP completes section 1 part 1 and sends this with sections 2 and 4 to the patient's GP. Part 3 is filed in the OO's patient records. HSG (94)2 (1994) states that the referral is invalid without the signature of the OO and the date of completion. The patient also signs to give his/her written consent to allow the OO/OMP to receive feedback about the referral. The Association of Optometrists (AOP)/British Medical Association (BMA) Guidelines (1995) state that it is 'essential' for this part of the form to be completed by the patient.

Section 2 part 1 is to be completed by the GP and part 2 is for his/her files. Part 1 is for the hospital records. Part 4 allows the ophthalmologist to reply to the GP copying the form to the OO/OMP. The latter parts of this form are rarely used in practise and the Ophthalmologist frequently produces his/her own correspondence.

If the GOS18 form is not used, the guidelines (AOP/BMA 1995) stress that the patient must be asked to complete a separate form eg AOP/95/1, authorising feedback. Although the OO/OMPs referral letter to the GP should always be passed on to the consultant if HES referral is undertaken (Curran, 1992; Tuck and Crick, 1991), this does not always

happen in practise (Jones et al, 1990; Linnell, 1995).

The GP initiated referrals may be made on forms eg PRL 1 (appendix Ic), or as a letter. It is often stated that more information is provided when the referral is made using a standardised format (Addley and Duffy, 1982; Kentish et al; 1987) and such a format has been suggested for GP referrals to the HES (Jones et al, 1990).

The Scottish and Northern Ireland GOS are run under different legislation from that in England and Wales. Health boards are responsible for the provision of services within Scotland, and three joint ophthalmic committees establish ophthalmic lists on behalf of the board. The Scottish referral form, GOS(S)(M) is the equivalent of the GOS18 (Appendix Id). Four health and social services boards administer the service provision in Northern Ireland. The Central Services Agency, under these boards, set up ophthalmic lists and pay fees and reimbursements. The GOS (NI) M, introduced in October 1993, allows for referrals to be made to the patient's GP and on to the HES (Appendix Ie).

Why are Patients Referred to the Hospital Eye Service?

In a survey many GPs indicated that they "did not feel confident with ophthalmology generally" (Featherstone et al, 1992). It is a medical discipline that requires considerable training and expertise with specialised equipment not routinely available in general medical practice. Ophthalmology training at undergraduate level is limited and a postal questionnaire of GPs in Nottingham identified that insufficient training was given (Vernon, 1988). The RCOphth (1995) considers that undergraduate teaching is inadequate. The Royal College stresses the importance of training at this level to allow patients suffering from eye disease to "be diagnosed accurately and treated efficiently in general practice". Even with additional training much of the treatment provided within the HES is very specialised, and expensive equipment and years of training are required for many techniques.

The deficiencies in GP training mean that large numbers of patients suffering from external eye conditions are referred to the HES (Harrison et al, 1988). Cataract referrals are also frequently GP initiated and the accuracy of these referrals has been shown to be high. GPs appear to lack confidence in examining the fundus of the eye thoroughly (Finlay et al, 1991), and either they do not usually undertake fundoscopy, or they do not report their findings in the referral letter (Harrison et al, 1988).

The ophthalmic practitioner refers his/her patients to the GP, where onward referral to the HES usually results (Perkins, 1990). The OO/OMP has an important role in generating

ophthalmic referrals, especially of asymptomatic conditions. Glaucoma suspects are largely referred by an OO or OMP (Linnell, 1995; Harrison et al; 1988; Franks and Diggory, 1995). The OO is also responsible for referring large numbers of patients with cataract, maculopathy, diabetic retinopathy and other retinal defects (Harrison et al, 1988).

Lyons and Hungerford, (1990) found that the 'optician' (no differentiation was made between OMPs and OOs) plays an important role in the early detection of ocular malignancy, referring 47% cases, of which 50% were asymptomatic. The GP initiated referral in 16% of cases.

Much of the work on ophthalmic referrals has studied Primary Open Angle Glaucoma (POAG) and diabetic retinopathy referrals:-

Glaucoma Referrals

Glaucoma affects between 0.5% and 1% of the UK population over the age of 40 years (Banks et al, 1968). 10% people interviewed by the Royal National Institute for the Blind gave glaucoma as the reason for their visual disability (Bruce et al, 1988).

POAG is the most prevalent type of glaucoma (Hollows and Graham, 1966). It is asymptomatic until an advanced stage (Franks and Diggory, 1995) and is associated with raised intra ocular pressure (IOP), visual field defects and optic nerve fibre damage. The disease is more prevalent in high myopes (Daubs and Crick, 1981), black populations (Hiller and Kahn, 1975) and family members of glaucoma sufferers (Hitchings, 1980; Miller and Paterson, 1962). Its prevalence increases with age (Gottlieb et al, 1983).

Treatment aims to prevent the progression of visual field loss, but late presentation makes treatment less effective; patients presenting with marked visual field loss experience further field loss at an accelerated rate (Wilson et al, 1982).

Many studies have analysed glaucoma referrals. OOs initiate more than three quarters of these referrals (Brittain et al, 1988; Gillie, 1982; Linnell, 1995: Tuck and Crick, 1991) and are important in glaucoma detection. Optometric practice-based studies show that between 12% (Hobley et al, 1992) and 15.9% (Port 1989) OO referrals are for glaucoma. 26.88% of OO referrals received at the HES in one study of ophthalmic referrals to a district general hospital were for glaucoma (Harrison et al, 1988), a figure that reflects the proportion of OO referrals treated by the GP alone.

Very few reports detail the actions of OMPs in this process. Approximately 10% of all cases with confirmed glaucoma were referred initially by OMPs (Tuck and Crick, 1989),

and OMPs refer more patients on average than OOs (Tuck, 1988a). In Southampton, where there are a larger number of practising OMPs, a study showed that many more OMPs refer directly to the HES without instructing the patient to visit their GP; 21 OMP patients were sent directly to the eye hospital compared with only 1 referred by an OO (Mackean and Elkington, 1982).

Tuck (1991) found that 0.9% OO eye examinations conducted on patients aged over 40 years resulted in referral for suspected glaucoma. The detection rate by OOs was found to reach a maximum for patients aged approximately 70 years after which the rate was seen to decline (Tuck and Crick, 1992). This decline may reflect the difficulties in encouraging elderly patients to present for examination.

Among practitioners the modes of testing for glaucoma have been found to vary considerably (Clearkin and Harcourt, 1983; Tuck, 1988b; Tuck and Crick, 1991; Vernon and Henry, 1989). Tonometry, disc evaluation and visual field testing are all felt to be important in glaucoma detection and are conducted in optometric practice. Contrast sensitivity testing is also effective in identifying early changes caused by nerve fibre damage (Ross et al, 1985). The tests conducted affect the accuracy of the referral (Tuck and Crick, 1994) and help prioritise outpatient appointments (Hitchings, 1993). Equipment to detect glaucoma is increasingly available in optometric practice (Tuck and Crick, 1994) though less is available to OMPs (Tuck and Crick, 1992).

Ophthalmoscopy, a technique that allows internal structures of the eye to be viewed, is conducted in all eye examinations (SI 1989/1230). The technique provides a view of the optic disc where the effect of raised intra ocular pressure may be visible (Kanski, 1989) eg. optic disc cupping, retinal vessel displacement, optic disc haemorrhages. Cupping of the optic disc is the most frequent basis for glaucoma referral (Steinmann, 1982) but is ineffective if used in isolation to diagnose glaucoma (Wood and Banquet, 1987).

Tonometry measures the patient's IOP. It is frequently used in optometric practice (Vernon and Henry, 1989) and over 90% OOs have a tonometer on the premises (Tuck, 1988b; Strong, 1992). One third patients have their IOP measured, rising to 50% in patients aged 40 years or over (Tuck and Crick, 1989).

Patients with suspicious discs are at definite risk of glaucoma, but without testing visual fields many patients are referred unjustifiably with suspected glaucoma (Crick, 1982, Harrison et al, 1988; Linnell, 1995). Field testing is not conducted comprehensively; about 10% of patients over 40 years have this assessment (Tuck and Crick, 1989). The highest glaucoma detection rates were achieved in one study by those OOs who used a

field screener on a routine basis for patients aged over 40 years (Tuck and Crick, 1994). 81-88% OOs have facilities to test a patient's visual field (Strong, 1992; Tuck and Crick, 1994). With increasing ownership of semi and fully automated field screeners and monitors, an increasing proportion of OOs in recent years have been conducting regular field testing (Tuck and Crick, 1994).

Vernon et al (1990) proposed a community-based screening plan using a non contact tonometer (NCT) alone. Their findings showed that additional analysis of the visual field was ineffective as a first line screening tool for glaucoma. This is inconsistent with work from other authors (Christoffersen et al, 1993; Sommer, 1990; Sponsel, 1989; Tielsch et al, 1991) who found that tonometry alone reduced the specificity. Whereas half of all glaucoma cases have an IOP within the range 21-25 mmHg, the accuracy of patient referral is low based upon an IOP alone below 26mmHg (Tuck and Crick, 1992).

GPs tend to refer patients with suspected glaucoma if they are suffering with symptoms such as headache, ocular pain, reduced visual acuity, or where there is a positive family history (Mackean and Elkington, 1982; Crick et al, 1982). Only one fifth of their referrals are felt to be justifiable and it has been shown that, in general, GPs do not have a good understanding of glaucoma (Brittain et al, 1988). This problem is not limited to British GPs. A study in Brisbane, Australia identified that only 15% GPs were happy with their knowledge and skills concerning primary open angle glaucoma (Jackson and Hill, 1995). In the UK, a glaucoma screening programme within general practice was shown to be ineffective by Sharp (1995). Only 12.2% referrals were found to have glaucoma, 13% ocular hypertension and a further 16.5%, a non glaucomatous visual field abnormality. Results showing the accuracy of OO referrals to the HES are listed in Table 1.2. The number of glaucoma sufferers who go undetected after eye examinations ie. false negatives, is unknown.

Referrals for Diabetic Retinopathy

Diabetic retinopathy was found to be the commonest cause of blindness in a West Scotland working population (Ghafour et al, 1983). It is not possible to predict which diabetics will develop serious retinal changes, though it has been estimated, during a 10 year study, that 60% of diabetic maculopathy may be prevented or retarded by laser photocoagulation if the lesions are detected early (Davies et al, 1989). In diabetes, retinal capillary non perfusion causes ischaemia. This stimulates the formation of new vessels on the optic disc or retina. Preretinal haemorrhaging of these vessels is common and

Table 1.2. Accuracy of OO Glaucoma Referrals

Authors	Referee	n	1.	2.	3.
Brittain et al (1988)	optician	93	44.1	21.5	34.4
	GP	29	13.8	7.0	79.3
Clearkin and Harcourt (1983)	OO	34	32.3	11.8	55.9
Harrison et al (1988)	OO	120	80.0		20.0
	GP	37.0			73.0
Tuck and Crick (1991)	OO	704	40.2	31.5	28.3

Key

1. Glaucoma confirmed

2. Glaucoma suspect - patient reviewed

3. No glaucoma detected

Values are given as percentages (rounding has affected some totals)

persistent intragel haemorrhage may eventually be accompanied by tractional retinal detachment. Damage directly at the macula can also result in dramatic visual loss (Kanski, 1988). The incidence of retinopathy is directly related to the duration of the diabetes (Linsky, 1988).

Measurement of the Vision/visual acuity alone is not adequate for retinopathy case finding in diabetics (Verco; 1987). Symptomless patients may have serious retinal changes (Blach; 1993). Scobie et al (1981) found sight threatening conditions in a significant proportion of patients in a diabetic clinic who where asymptomatic.

The Clinical Standards Advisory Group (DOH) states that consideration should be given to the organisation of retinal screening programmes for diabetic patients (CSAG, 1994). Cost benefit analysis has shown that such screening or 'case finding' is worthwhile in health benefit terms; the patient, with many more years of vision, and society, with a more productive member of the workforce and reduced overall health expenditure, both benefit from such strategies (Fendrick et al, 1992).

GPs are frequently involved in diabetic care. Retinal screening by these practitioners has been shown to be ineffective (Finlay et al, 1991) and training would be required (Awh et al, 1991; Bron, 1985; Yudkin, 1988). After short training sessions GPs performed exceptionally well in a three-centre study compared with a single OO group (Buxton et al, 1991; Sculpher et al, 1992). The study protocols were inadequate and too few subjects

were included to make results significant. Mason and Drummond (1995) questioned the study conclusions that considerable cost savings were possible using GP based strategies. OOs play an important role in screening for disease and detecting complications (Yudkin, 1988). They have been shown to be effective in assessing diabetic retinal changes (Burns Cox and Dean Hart, 1985) though this study was criticised for making assumptions from extrapolated data (Bhopal and Hedley, 1985). Visiting the local OO is convenient and high patient compliance has been shown in such schemes (Potts et al, 1988). Modest set up and low administration costs enable many patients to be successfully screened (Gatling et al, 1995).

Diabetics are still entitled to an NHS eye examination within the GOS (Health and Medicine Act 1988). Changes to the GOS Terms of Service place a legal requirement on the OO/OMP to report to the patient's GP after every examination of a diabetic patient (SI 1989/1175). This ensures that the GP is aware of ocular changes.

Initiatives within the primary care sector have enhanced the ophthalmic practitioner's role in the detection and monitoring of retinopathy in diabetics. Shared care schemes have been established and are coordinated by hospitals and health authorities/commissions (AOP, 1994). Referral protocols ensure that patients are directed to the correct service and unnecessary referrals and delays are prevented.

Problems Associated with the Present Ophthalmic Referral Process

The ophthalmic referral process has not previously been studied as a whole. Various research has been undertaken which looked at small areas associated with the process. A combination of these studies gives an impression of the process but there are gaps, and comparisons and examples from other medical specialities help to formulate hypotheses for further work.

Poor Referral Communication

Society depends on good communications, both personally, nationally and internationally. With the division between the primary and secondary NHS care sectors an exchange of information between a GP and a specialist is required when a patient needs to be seen in hospital. This is particularly important where the primary care doctor exercises a 'gatekeeper' function as in the UK (Westermann et al, 1990).

Although occasionally referral is conducted by telephone, in the vast majority of cases the

referral is made in writing (Roland, 1992b). This is a function that costs the NHS millions of pounds each year in secretarial and related costs (Epstein, 1989). The information provided within the referral should ensure that the specialist knows the expectations of both the referring doctor and the patient (Helliwell and Wright, 1991). In the same way the reply from the specialist should answer the questions and requests made by the referring doctor (Tudor Hart, 1989).

Studies that have looked at referral correspondence have frequently questioned specialists and GPs to identify what should be included (DeAlarcon and Hodson, 1964; Kentish et al, 1987; Lachman and Stander, 1991; McGlade et al, 1988; Salathia and McIlwaine, 1995; Westerman et al, 1990; Williams and Wallace, 1974). Required information includes: diagnosis, family history, present medication, results of tests conducted and symptoms, but requirements vary between individuals, studies and specialities. Following the devised criteria in these studies many referrals were "weak". In one sixth of referrals studied by Westerman et al (1990) the panel gained "no clear understanding of the patient's problem, diagnosis and management" from the referral letter. Lachman and Stander (1991) identified a wide variation in the standards of referral correspondence received and felt that this may be linked to various factors: the workload of referral agents, a lack of understanding of the information required, and a lack of contact between the hospital and the referral agent.

It was noted that patients sometimes have a better understanding of the need for a Consultant Dermatologist to know about their present medication than the GP (Fry, 1981). In one study many GPs did not include this information in the referral correspondence, but many patients brought all their medication to the first appointment without being asked (Fry, 1981). Hospitals may make up for referral correspondence inadequacies by requesting patients to bring prescribed medication to the first appointment (Bolingbroke Hospital, 1996).

Information provided by the specialist in the reply to the referee is an important form of practitioner education (Westerman et al, 1990). It has been speculated that if replies from the hospital are good, then this encourages the primary care provider to send good referrals (Lachman and Stander, 1991; Tudor Hart, 1988). However, a Scottish study identified that OOs often fail to receive any feedback from referrals; only 1 out of 29 OOs recorded that they often received a written reply from the GP following referral (Boggon, 1992).

The referral process is a vital communication link that needs to function well if the patient

is to receive optimum care and treatment. As Morrison and Pennycock (1991) commented:

"There can be little doubt that when an emergency referral is made with inadequate communication details the patient is disadvantaged from the outset."

For ophthalmic referrals, the HES specialist who reads the referral communication is required to prioritise the referral. He/she is also frequently required to make an assessment of the specialist tests and examinations that will be conducted eg. field examination, refraction, orthoptic assessment etc. Additional information provided within the referral correspondence may be required later when the patient attends for the appointment eg. present medication, detailed examination findings etc. In order for all the necessary information to be included it is essential for the GP to include any referral correspondence from the ophthalmic practitioner (Curran, 1992). As with other medical specialities, the "quality" of ophthalmic referral letters is extremely variable (Jones et al, 1990).

Poor communication with Referred Patients

Grace and Armstrong (1986) identified a considerable misunderstanding by the patient of the reason for referral. They suggest that better communication between GPs and patients initially would be beneficial (Grace and Armstrong, 1987). Glagow (1970) tested the effects of Health Education methods on patients screened for glaucoma. He concluded that the "tender loving care approach" was the important factor in patients attending follow-up appointments rather than the health education.

Lloyd et al (1993) identified that patients who reported that they had been unable or only partly able to discuss their health problem with their doctor were more likely not to attend for their ENT or gastroenterology appointment. They concluded the importance of the link between patient attendance and the quality of doctor-patient communication.

Inappropriate Referrals

Little research has been conducted into the appropriateness of ophthalmic OPD referrals, and as was discussed earlier (see p.21), a definition of what is meant by appropriateness is not straightforward. A recent Accident and Emergency Department (AED) study at the BMEH identified 50-70% ophthalmic referrals that could be classified as an inappropriate use of the emergency service (Kheterpal et al, 1995). Inaccurate referrals may also be considered inappropriate. Harrison et al (1988) identified many false positive referrals for

suspected squint and glaucoma. They recommended that greater use be made of community based screening programmes to reduce these inaccurate referrals. Westbourne Eye Hospital, Bournemouth identified many patients who did not need to attend their outpatient appointment and have proposed the use of OOs to review GP referrals prior to the HES referral being made (anonymous, 1995).

Delays within the system

Linnell (1995) identified an average delay of two weeks between referral from the OO for glaucoma and onward referral by the GP. In another study, one quarter of the patients who were finally diagnosed as having glaucoma, had waited four weeks or more for the initial appointment (Tuck and Crick, 1991). Howie and Taylor(1982) identified several patients who waited up to eight weeks before their referral was received by the HES. They concluded that direct referrals from the Ophthalmic Practitioner to the HES for some conditions would be appropriate.

Waiting times were identified in the White Paper, Working for Patients (1989) as an issue that must be addressed by the NHS as a whole. Pressure from Health Authorities and especially GP Fundholding practices as purchasers (National Health Service and Community Care Act 1990) may influence waiting times. However delays occurring before the GP initiates the referral will be unaffected. Unacceptable delays within the ophthalmic referral pathway have not been studied and it has yet to be established where the responsibility for the delay lies.

Patients who do not attend for their appointment

If patients do not attend (DNA) for an outpatient appointment the referral system may be said to have failed and NHS resources wasted. Verbov's study (1992) of a dermatology department identified the largest factor causing missed appointments was personal problems eg sickness. Failure of administration was also largely to blame for patients not receiving notification of their appointment or receiving information late. Similar problems are reported in other clinics (Alpert, 1964; Bigby et al, 1984; Frankel et al, 1989; Potamitis et al, 1994; Shah et al, 1977; Walsh et al, 1967). In a breast screening clinic non-attendance was linked to anxiety and fear (French et al, 1982) and this may have implications within the ophthalmological field because of the fear of blindness.

Long waiting lists can also result in patients forgetting an appointment (Verbov, 1992). However, Robin (1976) found that the waiting list can act as a screening mechanism with

patients not attending because their condition has resolved.

Funding Referral

The NHS and Community Care Act 1990 was an enabling Act to implement the changes proposed in the White Papers Working for Patients (DOH, 1989) and Caring in the Community (DOH, 1989). The Act lead to a division being made between the providers and the purchasers of Health Care. Contracts to provide services, covering quality, quantity and the price of health care services, were established.

Health Authorities

The District Health Authority (DHA) was made responsible for assessing the health needs of the resident population and purchasing health care to meet their needs. The amount of money that the Authority receives annually is calculated to reflect the relative health needs of the population. The Authority makes contracts with various local hospitals, for example, to meet the needs of in and outpatient services. These will cover many of the patients referred by local GPs. Occasionally patients are referred to hospitals that are not under contract to the DHA. Under these circumstances an extracontractual referral (ECR) is made. Frequently these occur as an emergency referral but elective ECRs eg. many tertiary referrals, are possible. It is the responsibility of the provider receiving the referral to ensure that the DHA will pay for the ECR.

The Health Authorities Act 1995 resulted in the merging of the DHAs and the FHSAs on April 1st, 1996. This means that the purchasers of both Primary and Secondary health care are all functioning as one Authority.

General Practitioner Fundholding

Under the 1991 NHS and Community Care Act practices with over 9000 patients could apply to become Fundholders (GPFHs). This has reduced to 5000 patients in England and 4000 in Wales for 1996 applications. Such practices are allocated monies to spend on services for their patients. Since 1991, over 1 in 3 GPs have become a fundholder (Chew, 1995). A deduction of their funding is taken from that which is made available to the HA. Unless the GP is one of the small number of GPs piloting the total purchasing projects, then the fund covers about 20% of a patient' hospital and community health care by value (Audit Commission, 1996a). Services omitted include: emergency referrals ie referrals to an AED, orthoptics, maternity services, chemotherapy and radiotherapy (Fry, 1993). All

these services are funded by the DHA regardless of whether or not the GP holds his/her own funds.

GPFHs are free to set up contracts with hospitals of their choice to provide services. They therefore have increased flexibility when deciding where to refer their patients. They can exert greater influence over service providers (Wainwright, 1996), giving the providers an incentive to improve quality. The GPFH also has an incentive to find the most cost effective care. There have however been questions raised about the referral decisions made by these GPs and whether financial rather than clinical decisions are being made (Audit Commission, 1996b).

While a substantial number of practices remain non-fundholding there is an incentive for providers to offer shorter waiting times to fundholding patients (McCullough, 1993). However, it has been shown in other health systems that where there are competing purchasers then the system is more likely to be inefficient eg. France and Germany (Tennison, 1992).

A study revealed that first wave GPFHs (Fundholders in 1991) in SE Thames Region achieved improvements in access to services and were referring some patients to private facilities for investigation (Corney, 1994). Referral to the private sector for cataract extraction, for example, has been undertaken by 38% practices in an Audit Commission Report (1996b). This report also identified that nearly half of GPFHs had reviewed their referral rates since becoming fundholders.

Research by the Audit Commission (1996a) has revealed that the costs of administering the fundholding scheme have not been met by efficiency savings on budgets. While a few fundholders have achieved many benefits for their patients, the majority have achieved only a few improvements. The report felt that one of the important factors in successful fundholding was high calibre practice managment.

Special Health Authorities

Under the Health and Social Security Act, 1984, Special Health Authorities (SHAs) were established. Eight London hospitals were granted this status with the responsibility of running postgraduate teaching, including Moorfields Eye Hospital, London (MEH). They were directly funded and responsible to the Department of Health and Social Security replaced by the Department of Health in 1988. The SHAs did not enter the internal market in 1991 implemented under the NHS and Community Care Act 1990. This was criticised by Tomlinson in his report (Tomlinson, 1992) because of the "free" service that

was being provided to purchasers by these providers. DHAs and GPFHs were therefore not paying for the care provided to their patients who were being treated at these hospitals.

Several SHAs have been awarded NHS Trust status in recent years eg. MEH. However, some do remain eg. National Hospital for Neurology and Neurosurgery, The Easterman Dental Hospital (Chew, 1995), further plans for these units to merge with other NHS Trusts are being considered (NHS Executive, 1995).

Reasons for this Study

Many studies have been conducted to examine minor, often detailed factors, within the complex ophthalmological referral pathway. Studies have been both retrospective and prospective, both inside and outside the HES.

The climate within the health services is constantly changing. NHS eye examinations, within the GOS, are no longer available to the many of patients and hospitals compete for contracts to care for patients. Most ophthalmic referral research was completed prior to these changes and a review of the whole ophthalmic referral process was necessary.

It is hoped that this study will not only assist in the future planning of HES clinics for new patients, but also improve the interface between the ophthalmic practitioner, the GP and the HES. By improving the efficiency of the referral system all services will run more effectively, costs would be reduced and ultimately patients would benefit.

Possible ways of Studying the Referral Process

There are various methodologies available for the study of the referral process. Clearly there are various points along the referral pathway where referrals can be studied:

Ophthalmic Practitioner Referral Stage

Reviewing referrals at this stage in the process has been conducted in the past (Claoué, 1988; Hobley et al, 1992; Port and Pope, 1988; Port, 1989;). The advantages and disadvantages are:

Advantages

- It should be possible to identify all referrals instigated by the Ophthalmic Practitioners studied.
- All information provided within the referrals at this point is available, whereas it is often unavailable later on in the process.

- May permit regional comparison to be made

Disadvantages

- No GP referrals are included
- As Ophthalmic Practitioners rarely receive any replies from referral correspondence it is not possible to assess the referral outcome or the accuracy.
- Patients may not act on the referral made.
- The study would not identify any action taken by the GP if he/she dealt with the referral without referring to the HES, or if no action was taken.
- Previous studies have had low response rates.
- The study method can be expensive
- The study has to be conducted in many different OO/OMP practices.
- Frequently only keen practitioners get involved causing an inherent bias.

<u>GP Referral Stage</u>

Perkins (1990) reviewed his referrals at this stage in the process. He was able to study waiting times and referral outcomes for 45 out of 50 patients. The advantages and disadvantages are as follows:

Advantages

- GP referrals are included.
- All the referrals dealt with by the GP are included. This includes those OO/OMP referrals dealt with by the GP and not referred on eg. systemic hypertension, and those that are referred on to the HES.
- May get replies on referral accuracy and outcomes from the HES
- Can compare regional variation
- May also be able to include referrals made to the private health care sector

Disadvantages

- Omission of OO/OMP referrals that do not arrive at GP practice because
  a. the patient does not act on referral
  b. referral lost in GP files
  c. referral lost in the post
- Expensive because the study would need to be based in several GP practices to get a good sample.
- May not get a reply from HES regarding accuracy and outcomes.
- Will not include direct OO/OMP referrals unless informed by ophthalmic

practitioner of referral.

- Frequently only enthusiastic practitioners will become involved in the study which may bias the data.

HES based study

Most ophthalmic referral studies have been HES based. This includes the large study by Harrison et al (1988) which looked into all Ophthalmic referrals. Other HES based studies have looked at certain referred ocular conditions only eg. Brittain et al (1988) and Clearkin and Harcourt (1983) studied glaucoma referrals.

The advantages and disadvantages of this type of study are:

Advantages:

- The accuracy and the outcome of the referral are known.
- All the information regarding the referral should be seen including the contributions by the OO and by the GP.
- A large number of different OO and GP referrals are assessed.
- The study method is cheap because many referrals can be studied on one site.

Disadvantages:

- Not all OO/OMP referral correspondence is included with the GP referrals
- Referrals lost within the referral process are not included.
- The study does not identify regional variation unless several hospitals are compared.
- OO/OMP referrals dealt with by the GP alone are not included.
- Only NHS referrals are included in the study.

Combinations of the above methods

By combining two or all three of the above methods a more accurate assessment of the system will be possible. This would require a team of researchers if such a task were to be undertaken. Obviously the ideal method of studying referrals is to monitor the referral from start to finish. There are however enormous problems involved in such a study especially where GPs refer to a large number of hospitals and OOs to many GP practices. In particular, a London based study would involve enormous logistical problems due to the large number of hospitals providing ophthalmic services.

The only known study that has attempted to follow ophthalmic referrals was conducted by Tuck and Crick (1991) as part of the IGA study. They identified a group of glaucoma referrals from OO practices and attempted to assess the accuracy. Of 1505 referred

patients with suspected glaucoma, a diagnosis from the Ophthalmologist was obtained for 704 patients. The GP made a decision against referral in about a third of the 125 cases where patients did not attend for HES examination. Some of these patients were in the high risk categories.

Other aspects of the Referral Process

There are various other ways of obtaining information about the referral process. Surveys can be conducted to identified the opinions of those patients who have experienced the referral process and practitioners who are involved daily in making ophthalmic referrals. Consultants who receive referrals are frequently questioned about their opinions on the referrals they receive (eg. DeAlarcon and Hodson, 1964; Williams and Wallace) and Health Authorities who are the purchasers of services for their areas are responsible for negotiating contracts with providers. Identifying breakdowns within the referral process could also be assessed eg. DNAs and referral delays.

Aims and Hypotheses

The study aimed to:

- identify the patterns of routine and urgent ophthalmic community referrals received by the HES.
- identify factors that may affect ophthalmic referrals.
- assess the accuracy of referrals.
- identify the patients' experience of the referral process.
- explore the views, experiences and practice of the professionals participating in the referral process.
- analyse the reason for failure to attend the first outpatient appointment and identify any relationship with the referral process.
- suggest ways in which the ophthalmic referral process may be improved.

To meet these aims a series of studies was undertaken. The studies were felt to be the best use of the limited resources and manpower available.

The main study was hospital based. A HES based study is a cost effective and efficient method of obtaining a large amount of information in a relative short period. The study was also part funded by MEH. The hospital was eager to learn about the referrals they were receiving and ways in which their services could be improved to reflect the

requirements of the referees. The problem of the study being based in one hospital was reduced by conducting a comparative study in another eye hospital in Birmingham. Further comparison, on a more national scale, was limited due to resources. In addition the problem of missing emergency referrals in an OPD study was overcome by conducting an additional study within the AED.

Surveys of patients were conducted once the patient had arrived at MEH. Questions to assess their ease of access and experiences of the referral process were posed. Additional surveys of practitioners, both GPs and OOs were also undertaken to gain an insight into the referral process from those involved in referring patients.

New patients failure to attend for their HES appointments was also seen as a possible problem which may be associated with the referral. The reasons for not attending and any links with the referral process were explored.

In meeting these aims the study tested the following hypothesis:

The Ophthalmic Referral Process is an effective means of transferring patients from the community to the care of the Hospital Eye Service.

This hypothesis will be tested using the series of null hypotheses identified throughout the Thesis.

2. REFERRALS TO AN OPHTHALMIC OUTPATIENTS DEPARTMENT

2.1. Introduction

The NHS referral process is tightly controlled with the majority of patients being referred via their GP. Referrals to ophthalmic outpatient departments are usually in writing (DeAlarcon and Hodson, 1964; Long and Atkins, 1974; Roland,1992a; Williams and Wallace, 1974), and it is the correspondence which provides the basis for this referral study.

Types of referrals, conditions referred, referral initiators and the information provided within the correspondence, all help to identify referral patterns. This information also helps to identify current ophthalmic practice within the primary care sector as findings gleaned during an examination are often contained within the referral correspondence (Harrison et al, 1988).

2.2. Aims and Hypotheses

The studies aimed to identify and analyse the referral routes to ophthalmic outpatient departments in London and Birmingham by a review of the referral correspondence. The reasons for referral and information provided within the referral correspondence were also examined. A comparison between the two hospitals was undertaken to identify any regional variation in the patterns of referrals.

The following hypotheses, stated in the null form, were tested:

- There is no difference in the referral patterns between the two hospitals.
- There in no difference in the quality of referrals between the two hospitals.
- There is no difference in the quantity of information included in the referral correspondence received at the two hospitals

In addition studies on some of the referrals received at Moorfields were conducted to test the following hypotheses, stated in the null form:

- There is no relationship between the quality and quantity of information included in a referral and the year of qualification of the initiating GP.
- There is no relationship between the quality and quantity of information included in a referral and the year of qualification of the initiating OO.
- There is no difference between the quality of information included in a referral and

whether the referral was initiated by an OO or a GP.

- There is no difference between the quality of information included in a GP referral and the referral format.
- There is no difference between the quality of information included in a OO referral and the referral format.
- There is no relationship between the information included in a glaucoma referral and the accuracy of the referral.
- There is no seasonal variation in the pattern of referrals received at MEH.

2.3. A Study of Referral Correspondence to Moorfields Eye Hospital

2.3.1. Setting

The study was undertaken at MEH who jointly funded this research project. In order to deal effectively with new patients, the hospital was keen to learn about their referrals. Improvements in the processing of new patient referrals is of prime importance to the hospital and it was felt that an in-depth study of the referral correspondence should be undertaken.

MEH is both a local and national centre for eye care. Locally, the hospital acts as a referral centre receiving referrals from all four Thames regions. On a national scale, MEH receives tertiary referrals from other Ophthalmology departments throughout the country. MEH's status as a Special Health Authority changed in April 1994 when the Hospital was granted Trust status.

The fact that MEH is a London based service must be considered. London has been identified as an area of particular concern in terms of health care needs (Benezeval et al, 1992). A relevant factor is that difficulties associated with communications between the primary and secondary care sectors have been identified (Hughes and Gordon, 1992). Traditionally London relied heavily on hospital based services due to the poor development of primary health care. High population mobility, poverty, large ethnic minority populations and many homeless people make providing primary care services difficult. The Acheson Report, published in 1981, by the London Health Planning Consortium (LHPC, 1981) identified the large divide between GPs and those working in prestigious teaching hospitals. The study identified the large numbers of single handed and elderly practitioners and few primary health care teams. Many premise were inadequate and isolated working conditions alienated GPs from community based services. Many recommendations in the Acheson Report (LHPC, 1981) were targeted at improving

general practice.

However, although improvements were made during the 1980s (Hughes and Gordon, 1992), Tomlinson's report in 1992 (Tomlinson, 1992) found that the primary and community care health services in London were underdeveloped. The recommendation was made that resources should be diverted from the hospital sector into these services and that further money should be made available to raise the standards of GP premise in Inner London. This recommendation was followed and in 1993 the report "Making London Better" provided considerable sums to be allocated to the London Initiative Zone (LIZ). This allowed the improvement of the primary care sector eg £85 million was made available to LIZ in 1994-5 (DOH and OPCS, 1995).

The problems associated with a London based study could result in difficulties if this report's findings were to be used by regional hospitals in other parts of the UK. Ideally a study based in representative Eye Hospitals throughout Britain, both in urban and rural locations, would have produced a better analysis of national referral patterns. However, such a study was not feasible for a sole researcher and funding was restricted. It was therefore decided to repeat the study at one regional Eye Hospital to provide a comparison with the work conducted in the Capital (see 2.4).

MEH Referrals

Referrals to MEH fall into two distinct categories: designated (to a named Consultant) and non-designated (no Consultant named). All non-designated referrals enter the hospital via the Primary Care Clinic (PCC). Consultants within the hospital may also forward their referrals to the PCC if appropriate. All referrals are scrutinised by the Clinic Fellow who prioritises the appointments with reference to the likely need for further assessment eg. visual field assessment, refraction, orthoptics. At this stage referrals may be directed on to specialist clinics, for example when a 'non-designated' second opinion request is received.

The PCC provides a multi-disciplinary service ensuring that patients are fully examined at their first appointment. 57.4% of patients are treated and discharged from this clinic without the need for reattendance or more specialised services (MEH, 1993).

The Tomlinson report (1992) stressed the need to provide a more community-based service. In April 1993 MEH opened a clinic at St. Andrews Hospital, Bow (CEB). The service operates along the same multi-disciplinary lines as the PCC and follows the same protocols. Patients seen at this clinic are selected by their home postal district alone.

There is no reason to believe that the patient population is any different from those attending the main hospital PCC.

2.3.2. Pilot Study

Method

The study was carried out during 20 consecutive clinic days; 20.08.92 - 18.09.92 in the PCC. Clinic lists of patients attending each clinic were collated (12.08.92 - 25.08.92.) and used as the study population. No amendments were made to take account of late appointment bookings and walk-in patients.

Referral letters were scrutinised. The data was collected using a tick style data collection table with appropriate section headings (Table 2.1). Ticks were colour coded to identify

Table 2.1. Data Collection Categories

Subject	Data collection categories
Referral Source	Initiator
	Referral Pathway
	Postcode GP (or source if not via GP)
	Type of Practice: Fundholder, group or single handed
	Referral format
Time Intervals	1st consultation
	2nd consultation
	Letter received by MEH
	Appointment
Patient Details	Gender
	Date of Birth
Referral details	Diagnosis
	Symptoms
	Support services eg. Low Vision Aid Clinic
	Operational service eg. BD8 Registration
	Examination findings
	Additional information eg medication, GOH, onset etc.

the source of the referral eg. GP, OO. Additional written comments were added if the category was not listed. Referrals were classified using the following criteria:

1. Diagnosis - International Classification of Diseases (WHO, 1992).
2. Symptom classification was adapted from listings by Ball (1982).
3. Clinic/ Specialist services eg. contact lenses, low vision aids.

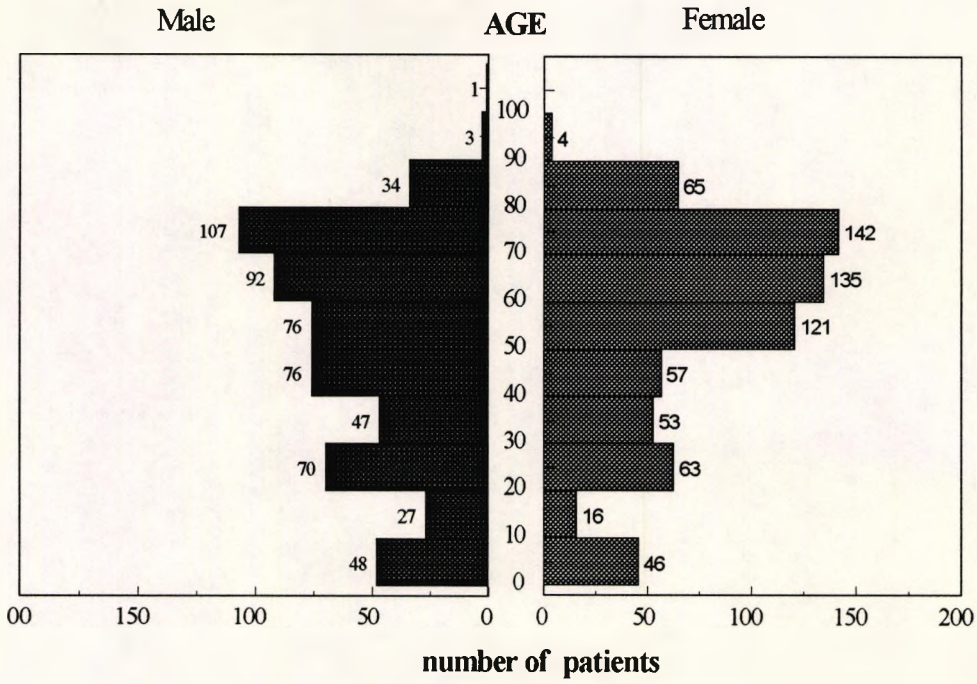
Results

1283 referral letters were analysed. All the referral correspondence received by the hospital and all patients listed on the clinic schedules were included in the study. 60.1% of patients referred were over 50 years and the majority (54.7%) female (Figure 2.1).

Referral initiators

GPs referred the majority of patients to PCC(61.6%). 10.4% of GP referrals stated that the patient had been referred by their 'optician', although no correspondence was enclosed. 1.8% of GP letters had reports attached from an OO which were 'inform only' reports.

Figure 2.1. Age/Sex Distribution (Males N=581, Females N=702)



Only 0.5% of GPs referral letters stated that they were from Fundholding practices and none of the 332 OO or 23 OMP referrals stated that a GP had initiated the referral. No referral letters were received from orthoptists, or occupational doctors or nurses (Table 2.2).

Table 2.2. Referral Initiator

Referee	No. of Pts
GP	790
'optician' (letter not enclosed by GP)	92
OO	332
OMP	23
AED self referrals	18
AED referred by GP	4
AED referred by other	1
self or family referral	10
other hospital	12
School nurse	1
Total	1283

Table 2.3. Referral Correspondence

Referee	Correspondence	Number of referrals*
GP	Form	203
	Letter	882
OO	GOS 18	200
	Other forms	64
	Letter	68
OMP	GOS 18	10
	Other forms	6
	Letter	7

*** It should be noted that two referral letters/forms may be received for one patient.**

Referral Correspondence

A letter format was the most frequently received from GPs; 81.3% of referrals were letters (Table 2.3). The GOS 18 was the most frequently used OO format. Many GPs chose to ignore the allocated section for their comments on this form and enclosed an additional letter or form.

Reason for Referral

The most common diagnosis was cataract (24.6%). Problems associated with the eyelids were also commonly referred (13.10%) and accounted for many of the young to middle age patients seen (Table 2.4). 22.2% of referrals offered no diagnosis.

Patients' symptoms were frequently reported with or without a diagnosis. The most common symptom was nonspecific visual decrease in 21.8% of patients. No symptoms were experienced by 3.0% of patients and no reference to symptoms was made in 35.6% of referrals. When symptoms were reported, the onset was recorded in 57.6% of referrals. 4.4% of practitioners requested a clinic or operational service for their patient. A shorter waiting list (13), low vision aid assessment (13), second opinion (12) and cosmetic squint surgery (10) were the most frequently specified. Many practitioners gave a diagnosis and/or symptoms in addition to this request.

Test Results Recorded

OOs and OMPs conducted and recorded a large number of the clinical tests. 94.6% of OO referrals specified the vision or visual acuity compared with only 8.9% of GPs. IOP readings (42.0%) and the lens status (38.3%) were also frequently recorded by the ophthalmic practitioners. Due to the limitations of the 'tick method' of data collection, a comparison between the tests conducted and the condition referred was not possible.

Discussion

With the large number of patients referred to MEH, acquiring considerable data in a comparatively short period of time is possible. The data collection method prevented much of the information being analysed in depth, but provided a basis for developing a computer data collection system.

The pilot study identified problems with the data collection technique. Referral correspondence was scrutinised at an inappropriate point in the processing of referrals at MEH. Neither urgent appointments nor and non-designated referrals, which the PCC

Table 2.4. Diagnosis given in Referrals

Diagnosis Classification	GP	OO	OMP	Other	Total
retinal detachment	2				2
diabetic retinopathy	5	5		2	12
retinal vascular accident		2			2
maculopathy	13	57			70
other retinal defect	6	25	1		32
uvea		2		2	4
glaucoma	26	58	5		89
cataract	197	110	7	5	319
rx. and accommodation	24	5	2		31
cornea and sclera	39	16	1	1	58
conjunctiva	39	5	1	1	46
eyelids	156	8	1	4	169
lacrimal system	45	4			49
optic nerve	5			1	6
bin. vision anomalies/squint	76	19	2	4	100
vitreous	8			3	11
pupils					0
other	3	3			6
no diagnosis	239	43	5		287
totals	883	362	23	23	1293

Fellow directs straight to specialist clinics, were included in the study. This is clearly a weakness and the data collection technique must be amended for the main study.

A minority of referrals, which appeared to be OO/OMP initiated, did not include the ophthalmic practitioner's correspondence in the referral. It is important that the referral initiator was identified. The number of OMP referrals received was low and no detailed analysis of these referrals to MEH was possible.

Identifying whether the referral was from a group or single handed general practice, a multiple or independent optometric practice was difficult especially when the standard referral forms were used. Problems were also encountered with GPFHs. Very few GPs stated that they were GPFHs. It was felt that the data collected was inaccurate and that

such information may not always be given on the referral correspondence. As the study was strictly evaluating the referral correspondence, and the status of the GP was not easily obtainable from other sources, it was felt that this data could not be collected as part of this research. MEH was a SHA and therefore funding came directly from the DOH. It was therefore not part of the NHS Internal Market (see p.38).

This pilot study provided an invaluable preliminary assessment of the ophthalmic referrals received at MEH. It allowed the sample size for the main study to be calculated and confirmed the categories for data collection.

2.3.3 The Main Study

Method

All non-designated referral letters to Moorfields were scrutinised along with designated referrals that were redirected to the PCC. To ensure that all referrals were included in the study, correspondence was analysed at different points during the processing of appointments (Figure 2.2).

Referrals which were redirected from the Accident and Emergency Department (AED) were not studied.

Random Sample for Data Collection

All data was collected during 1993. Using results of the pilot study the sample size required was assessed (Appendix II). Data was collected by sampling 'weeks' using simple random sampling with stratification. Strata comprised 13 weeks from which 6 weeks were randomly selected using random numbers (Lindley and Scott, 1984). Strata were as follows:

February 27th - May 28th
May 30th - August 27th
August 28th - November 26th
November 27th - February 26th 1993

The strata did not follow the seasons in relation to the equinoxes and solstices, but were grouped into monthly sections (Table 2.5.) It was estimated from the initial study that approximately 400 referrals were received weekly at MEH. Non-designated referrals for second opinions were included in the study.

Figure 2.2. Referrals to Moorfields Eye Hospital

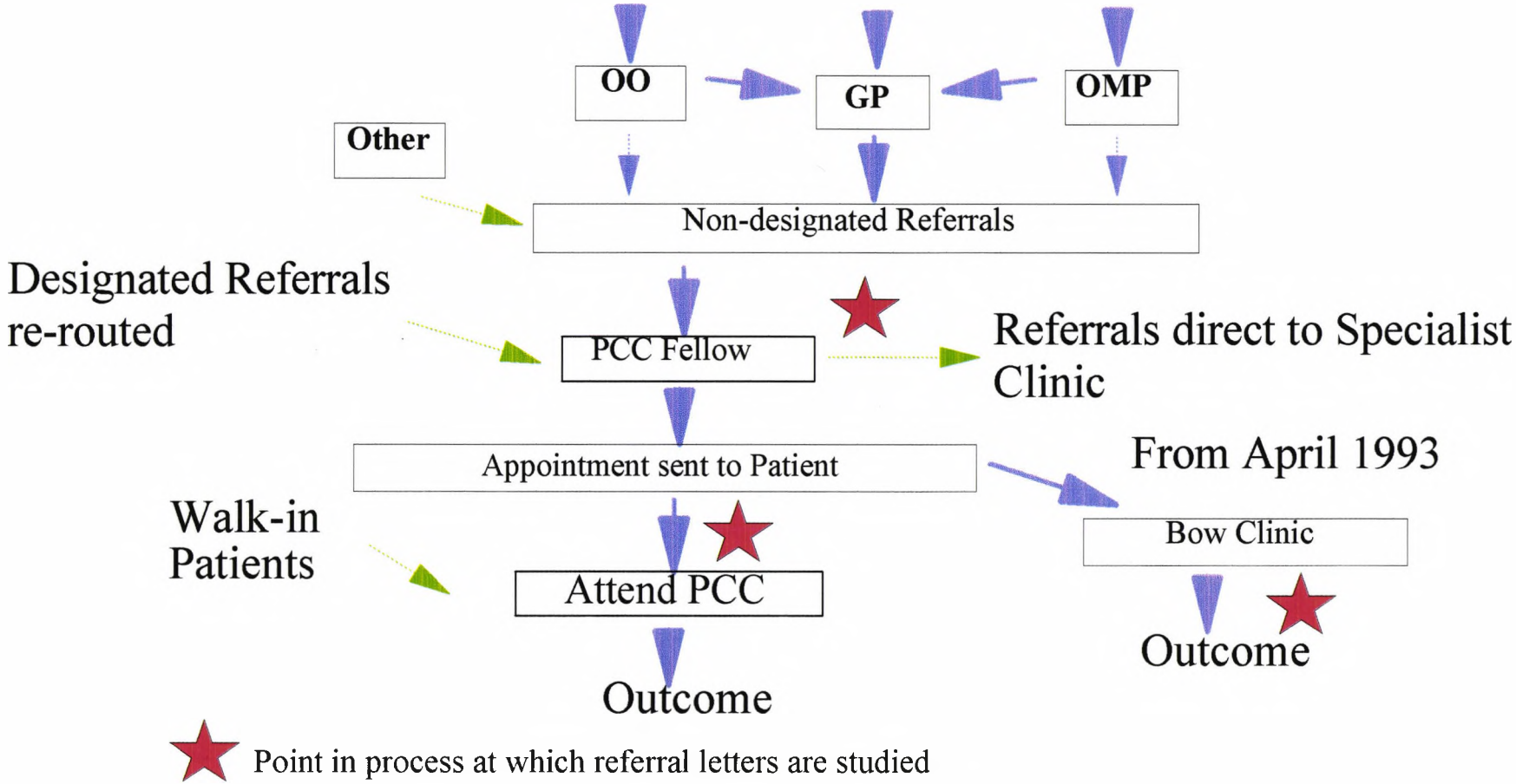


Table 2.5. Stratified Random Sample

Stratum 1	sn	Stratum 2	sn
March 1st	9	May 31st	22
March 8th	10	June 14th	24
March 15th	11	June 28th	26
March 22nd	12	July 12th	28
May 3rd	18	July 26th	30
May 10th	19	August 2nd	31
Stratum 3	**sn**	**Stratum 4**	**sn**
September 20th	38	November 29th	48
September 27th	39	December 6th	49
October 4th	40	January 11th	2
October 11th	41	January 18th	3
October 18th	42	February 8th	6
November 15th	46	February 15th	7

(sn = sample number used in stratified random sample)

Dates are shown "week beginning". As referral letters were not processed during the weekend, referrals arriving on Saturday and Sunday were recorded as arriving on Monday.

Collection of Data

Only information given in the referral letter was recorded Data was collected onto a DataEase™ PC data base (Appendix III). The pilot study results were used to create appropriate fields to allow data to be gathered efficiently and analysed. Age was the patient's age on 01/01/93.

If an ophthalmic practitioner had not identified himself/herself as an OO, an OMP or a DO, the assumption was made that an OO had initiated the referral (see Appendix IV). The pilot study showed the reasons patients were referred to the Eye Hospital fell into several distinct groups. In addition Reasons 4 and 5 were added to the classification.

1.*Diagnosis*

2. *Request for a Support Service* - The HES provides a number of support services which are complementary to medical treatment eg. contact lens clinic, low vision aid service.

3. *Request for an Operational Service*

I) Shorter waiting time

ii) Second opinion

4. *Symptoms*

5. *Unexplained Examination Results* - This was almost always the outcome of opportunistic screening/case finding.

6. *External or Systemic Factors* - Referral may have been prompted because of family history eg. glaucoma, or a systemic medical problem known to cause eye problems eg. diabetes.

Scoring referral letters

Quantitative Scoring

It was felt important that some numerical score should be given to referral correspondence as an assessment of the information which was provided. Each factor was equally weighted. It was not felt appropriate to weight any factor as being of greater value to the referral because so many different conditions were being studied.

Diagnosis = 1

Symptoms = 1

Additional Information related to General Health = 1

Additional Information related to Ocular Health = 1

Test Results = 1

The scores give no indication of the accuracy or relevance of information provided.

Qualitative Score

Several specialists at MEH were asked what information a referral letter for their speciality should contain. They were given the option to load certain important factors (see Appendix V). The scoring produced a qualitative evaluation of the referral letters.

Year of Qualification

The number of years the referring practitioner had been in practice was recorded. Calculations were used to identify whether this factor affected the ophthalmic referral. During 4 data collection weeks, the referee details were recorded using the Medical and Opticians Registers. Data was collected only for practitioners referring patients with given diagnoses. The weeks selected at random were: March 1st, March 22nd, June 14th and October 11th.

Accuracy of Referral

The diagnosis given in the referral letter was compared with the diagnosis reached at the outpatients clinic. The study was conducted for all patients referred to the Bow Community Care Clinic, St. Andrews Hospital, Bow from 7th June 1993 until 30th July 1993.

Glaucoma Referrals

OO referrals for glaucoma were assessed in detail. Specific measurements recorded in the referral correspondence were noted eg IOP readings. This information was collected from 20th September 1993 until 22nd October 1993. Only the information from the referral correspondence was included.

Results

8,435 referrals to MEH were scrutinised during the 24 weeks selected for the study (Figure 2.3). Referral pathways for each patient were identified (Figure 2.4). GPs frequently initiated external eye conditions; ophthalmic practitioners more often referred glaucoma suspects and posterior eye conditions (Figure 2.5).

The GP's postcode (or other initiator if the referral was direct) was recorded for each referral (Figure 2.6). The majority of referrals were initiated from north east London.

More women (4894) than men (3541) were referred (χ^2, df=1, p=0.00). No date of birth or age was recorded in 286 referrals. Where the data was available a mean age of 53.84 yrs (s=23.71, $s_{\bar{x}}$=0.34, Mdn=59 yrs) for females and 49.16 yrs (s=23.82, $s_{\bar{x}}$=0.41,Mdn=54 yrs) for men was calculated (Figure 2.7). 144 (2.7%) GP initiated referrals failed to give the patient's age or date of birth, 104 (5.1%) OO referrals via the GP did not provide this information, and 18 (23.7%) OO direct referrals.

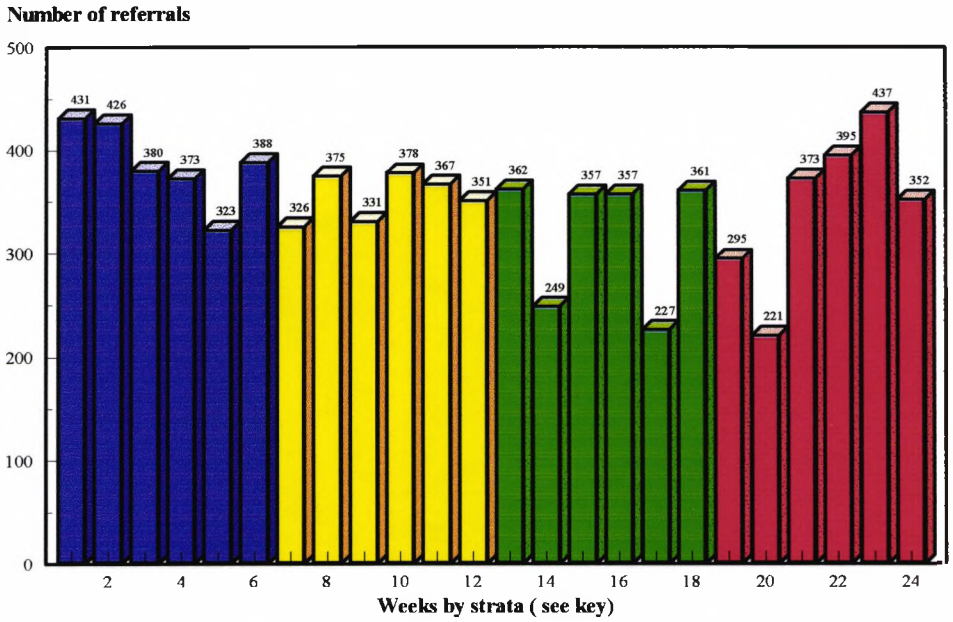
The intervals between consultation with the practitioner and the letter arriving at PCC are illustrated in Table 2.6 (where correspondence was dated).

GP referrals

GPs generate the majority of ophthalmic outpatient referrals (Figure 2.8) and were involved in 98.0% of all the referrals analysed in this study (Figure 2.4).

The 5,360 referrals from the GP alone were subdivided by the reason for referral (Figure

Figure 2.3. Referrals Included in Main Study



Key to Figure *

1 = March 1st to 5th
2 = March 8th to 12th
3 = March 15th to 19th
4 = March 22nd to 26th
5 = May 3rd to 7th
6 = May 10th to 14th

7 = May 31st to June 4th
8 = June 14th to 18th
9 = June 28th to July 2nd
10 = July 12th to 16th
11= July 26th to 30th
12 = July 26th to 30th

13 = Septmeber 20th to 24th
14 = September 27th to October 1st
15 = October 4th to 8th
16 = October 11th to 15th
17 = October 18th to 22nd
18 = November 15th to 19th

19 = November 29th to December 3rd
20 = December 6th to 10th
21 = January = 11th to 15th
22 = January 18th to 22nd
23 = February 8th to 12th
24 = February 15th to 19th

Figure 2.4. Referral Pathways

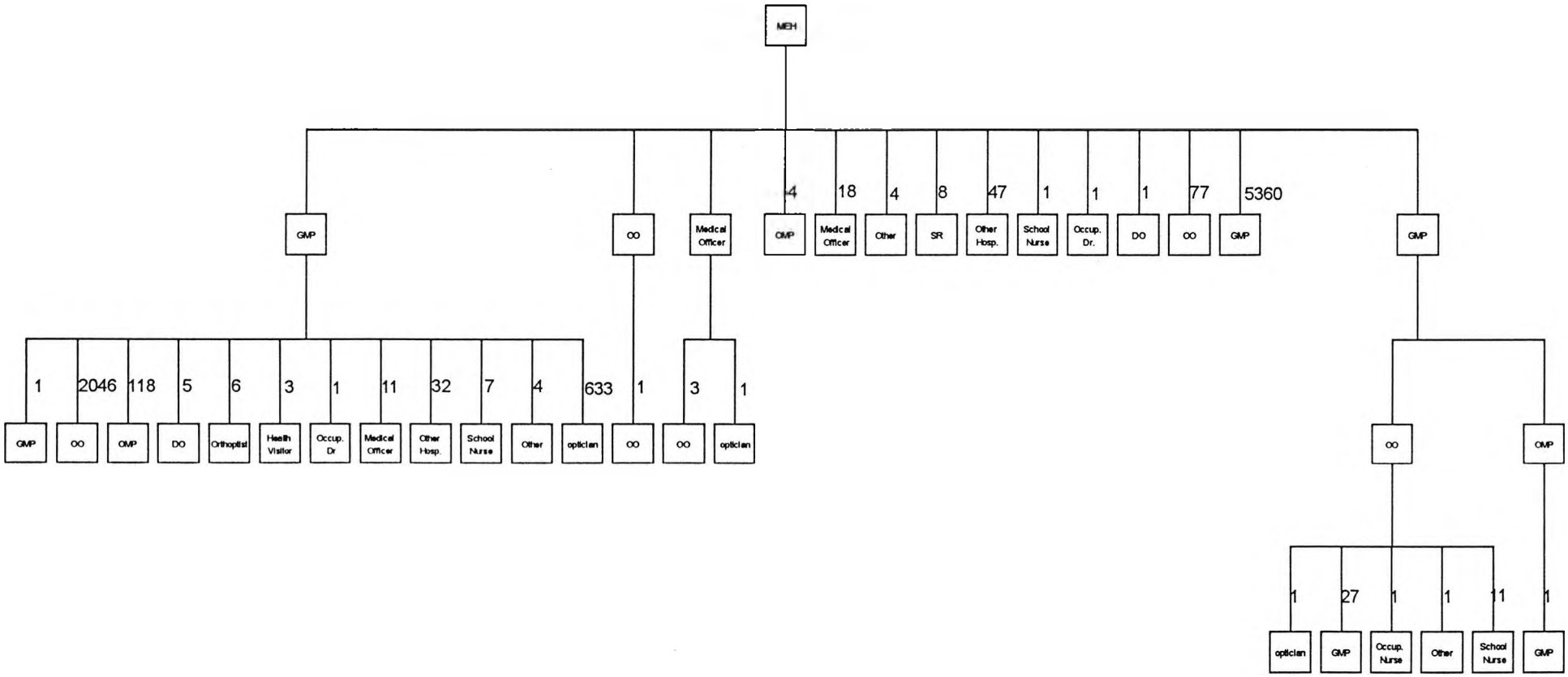


Figure 2.5. Referral Initiators by Main Diagnosis Classification

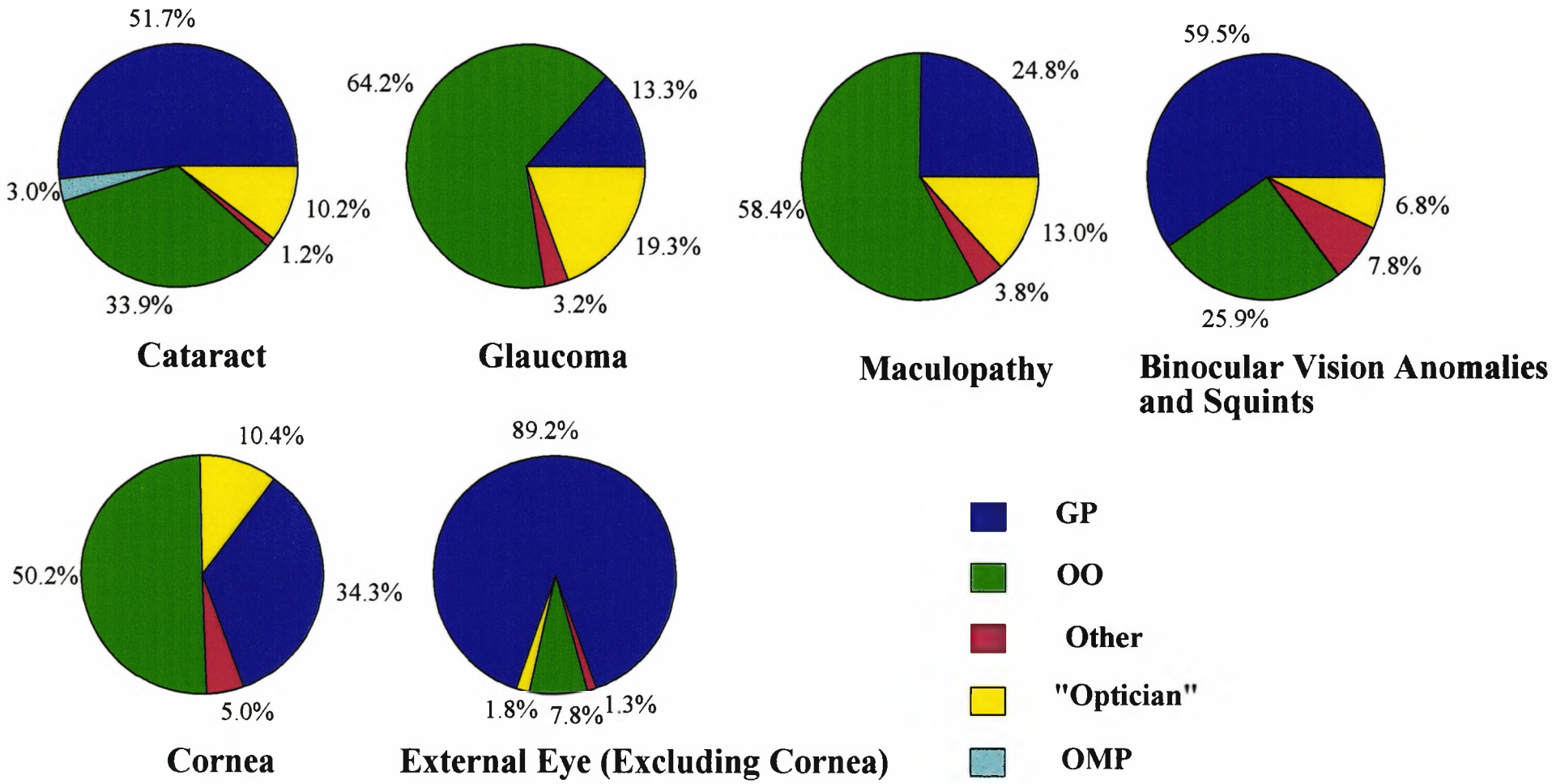


Figure 2.6 Health Authority of Patients GP
(or referral initiator if not via GP)

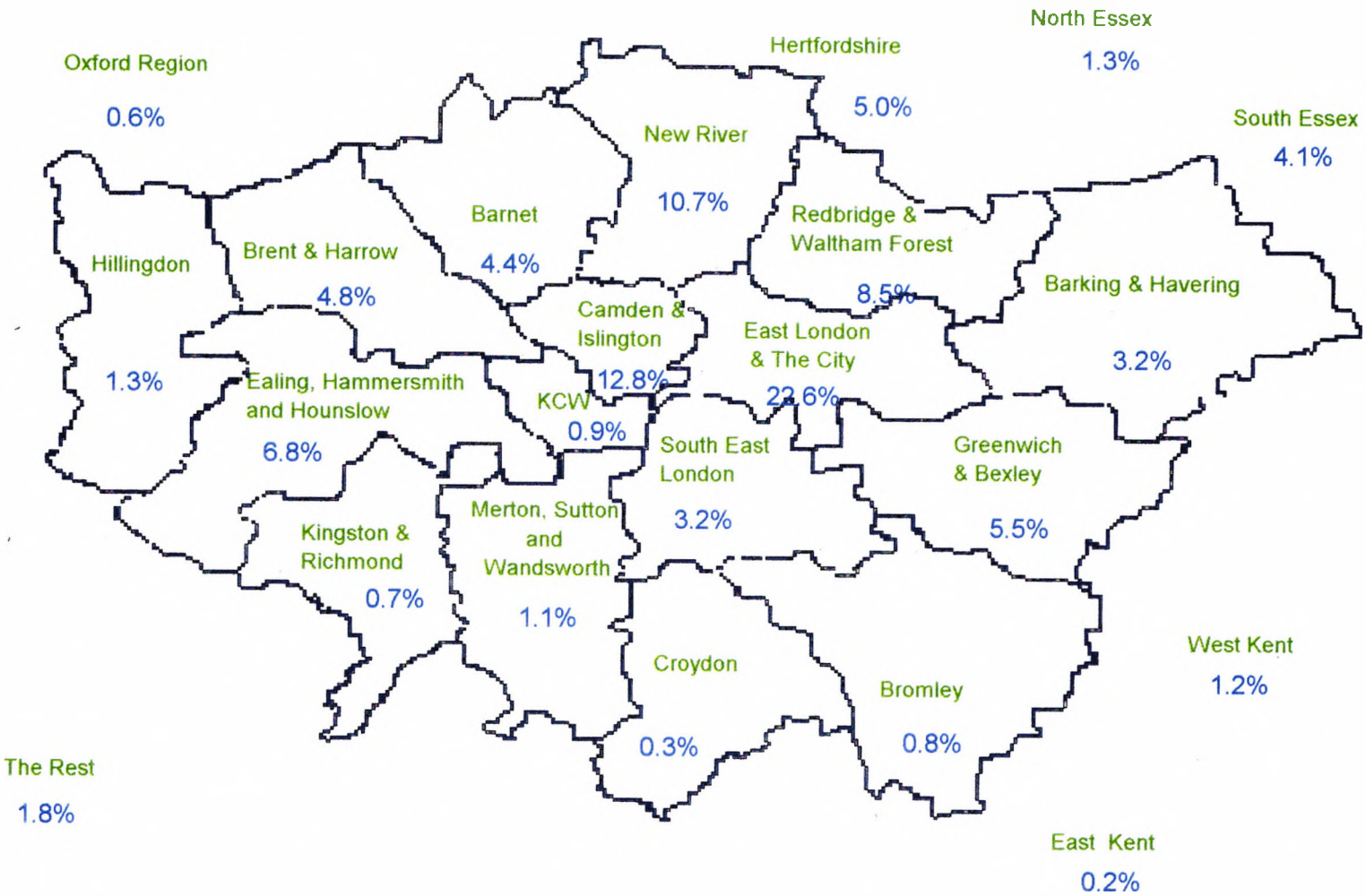


Figure 2.7. Age/Sex Distribution

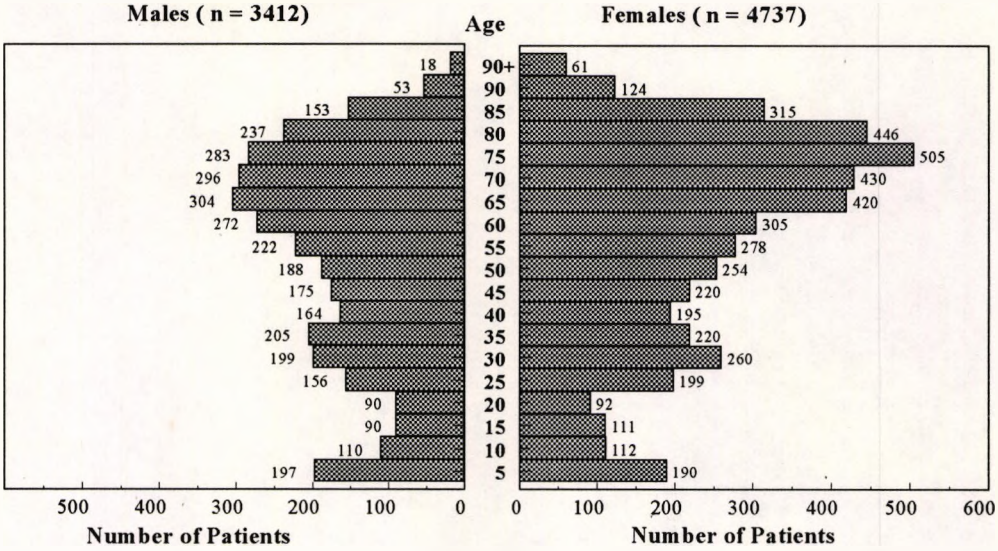


Figure 2.8. Referral Initiators

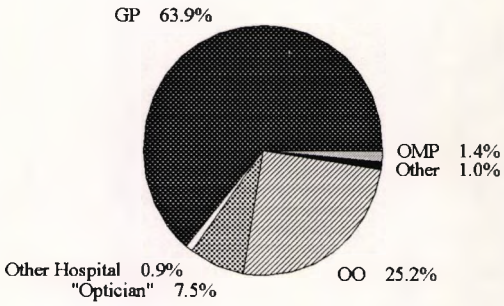


Figure 2.9. Reason for GP Referral

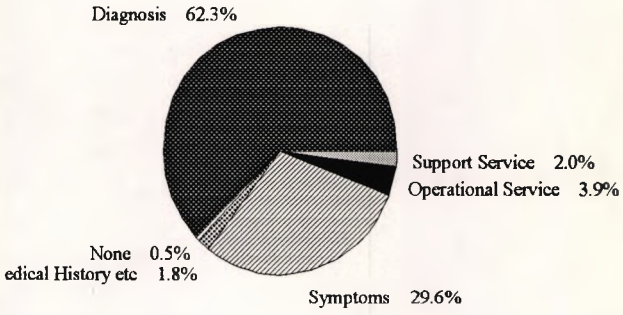


Table 2.6. Delays in the Referral Process

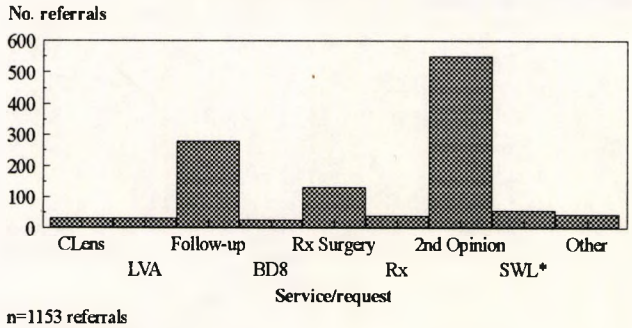
Referral route	N*	min	max	$\bar{x}$	s	Mdn	$s_{\bar{x}}$
GP direct	5,211	0	1,161	8.27	29.71	4	0.41
OO to GP to MEH	1,900	0	1,041	27.53	52.64	13	1.21
(OO to GP)	1,731	0	1,037	22.18	52.89	8	1.27
(GP to MEH)	1,864	0	283	6.42	12.51	4	0.29
OMP to GP to MEH	101	2	371	28.71	45.72	13	4.55
OO direct	67	0	434	17.91	54.60	6	6.67
All	7,478	0	1,161	13.97	39.26	5	0.45

Units = days (*only dated correspondence is included)

Table 2.7. GP Initiated Referrals with Diagnosis Classification

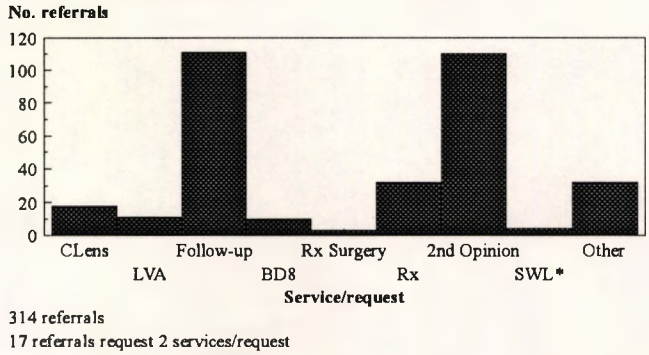
Diagnosis Classification	GP	Other	Totals
Retinal Detachment	1	7	8
Diabetic Retinopathy	28	22	50
Retinal Vascular Accident	3	11	14
Maculopathy	29	154	183
Retinal Defect	9	48	57
Uvea	11	29	40
Glaucoma	40	95	115
Cataract	720	302	1022
Refraction and Accommodation	160	19	179
Cornea	32	66	98
Conjunctiva	225	21	246
Eyelids	763	57	820
Lacrimal	199	46	245
Nerve and Visual Pathway	6	30	36
Binocular Vision Anomalies	167	143	310
Vitreous	8	13	21
Visual Disturbance	5	26	31
Pupils	5	7	12
Other	32	40	72

Figure 2.10.a. Request for Support or Operational Service - All GP Referrals



n=1153 referrals
39 referrals specified 2 options
* SWL = shorter waiting list

b. Request for Support or Operational Service without a Diagnosis - GP Referrals



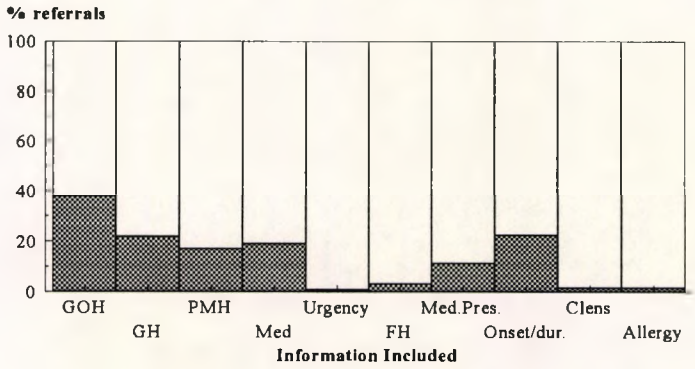
2.9.). 62.3% (3341) gave a diagnosis although in 975 of these referrals this diagnosis was given by another source eg. from a previous hospital appointment. Referrals for eyelid conditions and cataract comprised the majority of referrals (Table 2.7). 73 GP referrals gave two different diagnoses and two gave three.

1153 GP referrals requested referral for an operational or support service (Figure 2.10). The modal class was 'second opinion' where the most frequent diagnosis was maculopathy (85 referrals). Where no diagnosis was given, a request for an operational/support service was the reason for 314 patients being referred.

Symptoms were frequently recorded; 65.2% of GP referrals gave at least one symptom or indicated the patient was asymptomatic (Figure 2.11a). Decreased vision was the most frequently specified complaint and related to the high number of cataract referrals (Figure 2.11b). Far fewer symptoms were specified for eyelid conditions (Figure 2.11c).

Patients' previous medical history and medication were stated in some referrals (Figure 2.12). 20 referrals gave the patient's ocular history as the only reason for referral and 75 recorded the medical history alone. The findings of an ocular examination were the only information in 12 referrals and the remaining 13 referrals gave no classifiable information regarding the referral.

Figure 2.12. Additional Information - GP Referrals



2644 (49.3%) GP referrals specified no test or examination findings. Those which were listed may have been provided by another source eg. spectacle refraction from the patient's last eye examination (Table 2.8). External eye examinations were the most frequently conducted eg. examination of the lids, lashes and conjunctiva. Crystalline lens (740 referrals) and fundus examinations (231 referrals) were also frequently recorded. A measure of vision or visual acuity was recorded in 6.8% (367) of referrals. Of those referrals which stated a visual decrease, measurement of the VA was recorded in only 4.5% referrals.

The scoring protocol was applied to the referrals (Table 2.9, Figures 2.13a-f).

The letter format was used by the majority of GPs when referring patients (80.5%). Other GPs used the standard GP referral form (PRL 1- see Appendix Ic) or a self-styled form. A quantitative 'score' was given to assess the referral letters. These were grouped by referral correspondence type (Figure 2.14) but there was no statistically significant difference between the scores of the two formats ($p=0.08$, t-test, $\alpha=0.05_{1tail}$). The null hypothesis was accepted.

GPs also initiated referrals to the patient's OO (Figure 2.4). No initial GP correspondence was enclosed with any of these referrals. All the diagnoses were given by the OO; the modal group was cataract.

Table 2.9. GP Referral Diagnosis Scores - Summary

Diagnosis Classification	$\bar{x}$	s	$s_{\bar{x}}$	Max. Score*
cataract	1.92	1.21	0.04	8
glaucoma	0.63	0.74	0.12	7
maculopathy	2.45	1.59	0.30	13
binocular visual anomalies	1.90	1.18	0.09	8
external eye (except cornea)	1.67	1.19	0.03	5
cornea	2.38	1.26	0.22	8

*maximum score possible

Referrals from Ophthalmic Practitioners

2,884 referrals were received from Ophthalmic Practitioners (OOs and OMPs). Of these 635 referrals had no letter forwarded to the hospital (Figure 2.4). In 24 cases the GP stated that the referral had not been sent to him/her.

Ophthalmic Practitioners initiate the majority of referrals for glaucoma, corneal conditions and maculopathy to the department (Figure 2.5).

OO Referrals

2,127 referrals were initiated by OOs and classified under 3 headings:

1. OO referrals via the GP
2. OO direct referrals
3. Other referral routes

When the scoring protocols were applied, OOs scored higher than GPs for cataract, glaucoma, binocular vision anomalies and squints. GP's results were better for external eye conditions (excluding cornea). Maculopathy results were not compared as too few referrals were received from GPs, and corneal referrals, where the GP's average score was higher than the OO's, were not significantly different (Figure 2.13 and Table 2.10 and 2.11). The null hypothesis was therefore rejected. There was a difference between the quality OO's referral compared with those initiated by a GP.

All OO initiated referrals were analysed using the quantitative scoring protocol. There was no significant difference between the scores from OOs who refer forms or letters (Figure 2.15). The null hypothesis was accepted.

Table 2.10. OO Referral Diagnosis Scores - Summary

Diagnosis Classification	$\bar{x}$	s	$s_{\bar{x}}$	Max. Score*
cataract	3.02	1.17	0.05	8
glaucoma	2.37	1.29	0.07	7
maculopathy	6.03	1.92	0.13	13
binocular visual anomalies	2.78	1.17	0.11	8
external eye (except cornea)	1.30	0.92	0.09	5
cornea	2.13	1.34	0.14	8

* maximum score possible

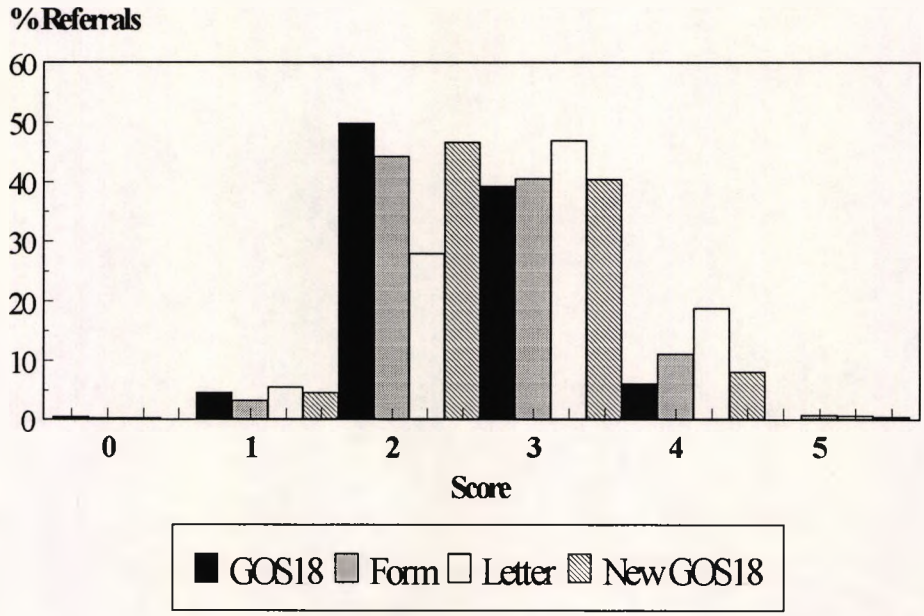
Table 2.11. Comparing OO and GP Referral Scores

Condition	GP	OO	p*
Cataract	1.9 (720)	3.0 (617)	0.00
Glaucoma	0.6 (40)	2.4 (389)	0.00
Maculopathy	too few GP referrals		
Binocular Vision Anomaly & Squint	1.9 (168)	2.8 (104)	0.00
Cornea	2.4 (32)	2.1 (92)	0.19
External Eye (excluding cornea)	1.7 (1162)	1.3 (101)	0.001

The value in brackets = n

***t-test, α=0.05**

Figure 2.15. Content Score by Correspondence Format



OO referrals via the GP

2046 referrals were received from the OO via the patient's GP ie. 96.2% of all OO referrals. 78.0% (1596) of OOs included a diagnosis in the referral letter (Table 2.12). 138 OOs included two, and 10 provided three different diagnoses. The GP added a diagnosis in 1.8% (37) of referrals. The diagnosis was identified as the reason for referral in 79.3% of referrals (Figure 2.16).

Table 2.12. OO Referrals via GP - Diagnosis Classification

Diagnosis Classification	OO	GP	Other
Retinal detachment	2		
Diabetic retinopathy	21		
Retinal vascular accident	9		
Maculopathy	227	1	7
Retinal Defect	111	1	1
Uvea	3	2	
Glaucoma	374	2	8
Cataract	599	6	3
Refraction and Accommodation	39	3	
Cornea	85		10
Conjunctiva	28	3	
Eyelids	44	2	
Lacrimal	28		
Nerve and Visual Pathways	8	2	
Binocular vision anomaly and squint	102	1	4
Vitreous	22		
Visual disturbance	17		
Pupils	10		
Other	25		1
Totals	1,754	23	34

Figure 2.16. Reason for Referral - OO referrals via GP

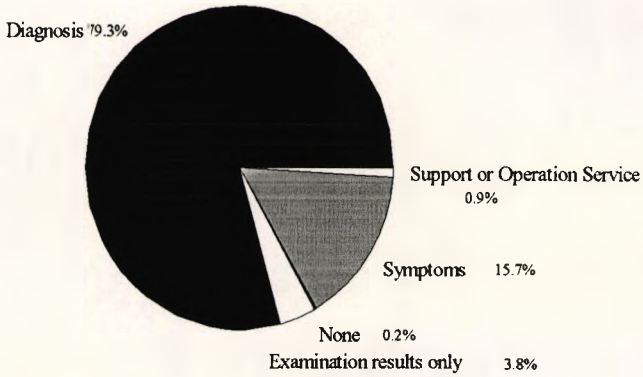
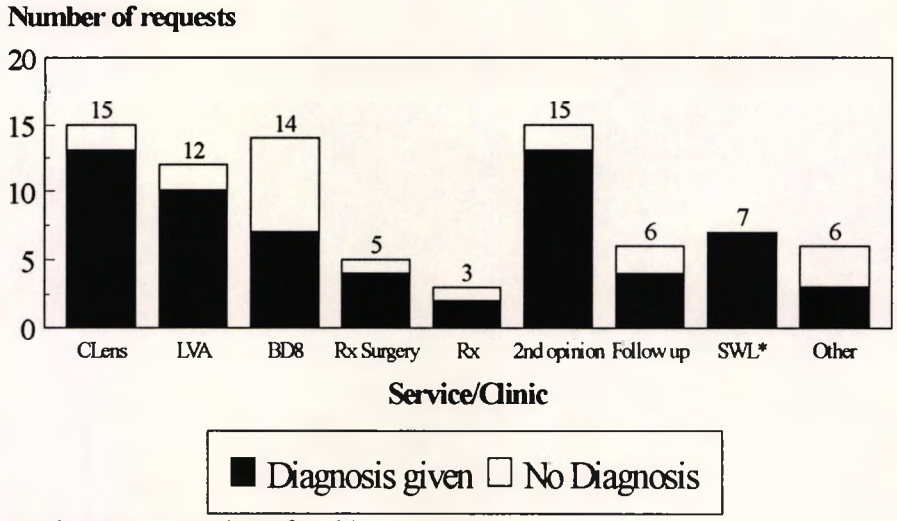


Figure 2.17. Support or Operational Service Request - OO referrals via GP



Total = 83 requests (75 referrals)
* SWL - shorter waiting list

85 requests in 75 referrals were for a Support or Operational Service (Figure 2.17). Of these, 18 contained no diagnosis.

The symptoms in OO referrals are recorded in Figure 2.18. 57.8% (1183) of OOs stated at least one symptom. 7.2% (148) of GPs stated an additional symptom to the OO. 323 OO referrals included symptoms but stated no diagnosis nor service request.

For 3.7% (76) of OO patients the reason for referral was unexplained examination findings. The remaining 6 referrals provided no classifiable information relating to the referral.

Examination and test results were frequently recorded by OOs (Table 2.13). For the main categories of diagnosed conditions, the directly relevant examination findings and tests conducted were identified (Figures 2.19).

GPs added information to 875 (42.8%) OO referrals (Figure 2.20); the patient's medication (21.7%) and the patient's general health (19.2%) were the most frequently added information.

OO direct referrals and other referral routes

77 referrals were received at the PCC from OOs alone. 21.0% (16) of these referrals were addressed to the patient's GP, one of which was a report and not a referral.

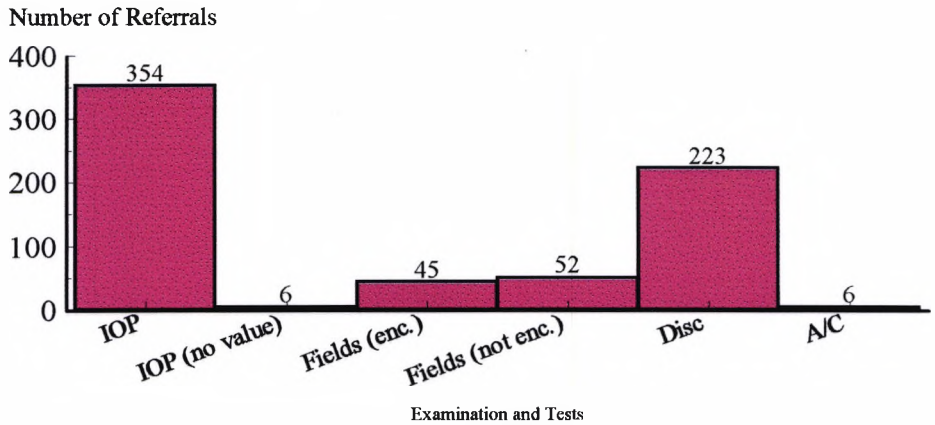
67.5% included a diagnosis (Table 2.14). 5 referrals requested a follow-up appointment

Table 2.13 Tests and Examination Results - OO Referrals via GP

Tests/Examinations	OO	% referrals
Refraction	1,761	86.1
VA D/ vision	1,891	92.4
VA N	1,187	58.0
PH	99	4.8
VA Ch.	420	20.5
Disc	496	24.2
A/C	8	0.4
Lens-view	697	34.1
Lens-describe	254	12.4
Vitreous	68	3.3
Vessels	78	3.8
Macula	298	14.6
Bg	170	8.3
Fundi	225	11.0
Bin.Status	157	7.7
Size	23	1.1
Motility	49	2.4
Pupils	68	3.3
IOP	772	37.7
Pres (no value)	21	1.0
Field (enclosed)	78	3.8
Field (not enc.)	124	6.1
k's	22	1.1
Cornea	119	5.8
Conjunctiva	33	1.6
Lid/lash	60	2.9
Lacrimal	25	1.2
Amp.Accom	14	0.7
location	142	6.9
Bp	4	0.2
Stereopsis	2	0.1
Iride	1	0.1
Amsler (enc.)	8	0.4
Amsler (not enc.)	61	3.0
EOM	29	1.4
Colour Vision	5	0.2
NPC	12	0.6

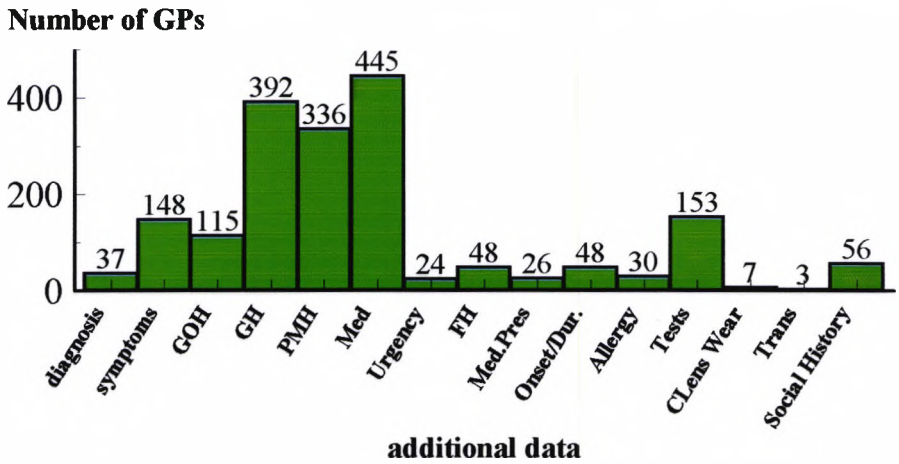
% of all OO referrals via GP

Figure 2.19c. OO Glaucoma Referrals (via GP) - Main Examination and Test Results



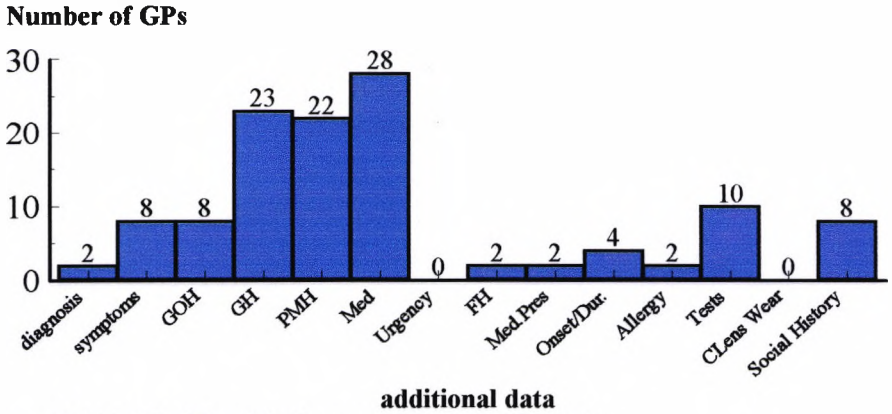
n = 374 glaucoma referrals from OOs

Figure 2.20. Additional Information Added By GP to OO Referrals



n = 881 (43.1%) GPs add atleast one item of additional information to OO Referral

Figure 2.21. Additional Information Added By GP to OMP Referrals



n = 52 (44.1%) GPs add atleast one item of additional information to OMP Referral

for existing MEH patients and 3 patients were referred for Blind or Partially Sighted (BD8) registration.

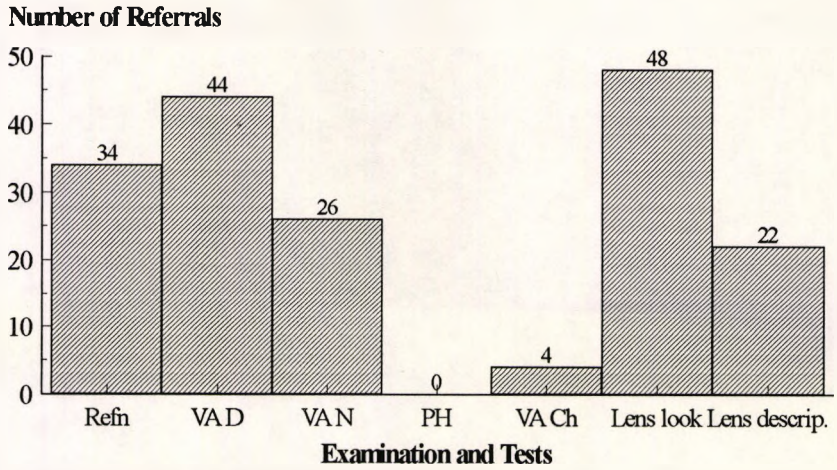
1 OO referral was referred via another OO prior to direct HES referral and 3 were referred on by medical officers.

OMP Referrals

122 referrals were initiated by an OMP (Figure 2.4). 118 (96.7%) were referred via the patient's GP to MEH and 4 were referred directly. The direct referrals all specified a diagnosis; 1 patient was referred for glaucoma, 2 for cataract and 1 for a conjunctival disorder.

83.6% of OMP referrals via the GP contained a diagnosis (Table 2.15). The GP gave the diagnosis in only 2 of 20 referrals which did not state one (Figure 2.21). However, OMPs were less likely than OOs to list patient symptoms, giving details in 54.2% of referrals. Only 2 OMP referrals gave no diagnosis or symptoms; 1 patient was referred for unexplained examination results and the other referral contained no reason for referral. OMP scores for cataract and glaucoma are illustrated (Figure 2.13). Those examinations recorded in cataract referrals indicated that the majority of OMPs included the visual acuity in the referral (Figure 2.22).

Figure 2.22. OMP Cataract Referrals - Main Examination and Test Results



n = 52 cataract referrals from OMPs
Referrals are via patient's GP

Table 2.14. OO Direct Referrals - Diagnosis

Diagnosis Classification	OO	Other
Retinal Detachment	1	
Diabetic Retinopathy	1	
Maculopathy	4	
Retinal Defect	1	
Glaucoma	13	2
Cataract	16	1
Refraction and Accommodation	1	
Cornea	6	3
Conjunctiva	1	
Eyelids	3	
Binocular Vision Anomaly	2	
Visual Disturbance	1	
Totals	50	6

Table 2.15. OMP referrals via GP - Diagnosis

Diagnosis Classification	OMP	GP/Other
Retinal Detachment	1	
Diabetic Retinopathy	2	
Maculopathy	5	
Glaucoma	11	1
Cataract	52	
Refraction and Accommodation	1	
Cornea	5	
Conjunctiva		1
Eyelids	2	1
Lacrimal	2	
Nerve and Visual Pathway	3	
Binocular Vision Anomaly	9	
Vitreous	1	
Visual Disturbance	4	
Other	3	1
Totals	101	4

Optician Initiated referrals - referral letter not enclosed

633 referrals from GPs stated that the referral had been initiated by an optician. Either the referral letters were not enclosed with the second referee's correspondence (611 referrals) or the initial referral letter was not received at the time of that referral (24 referrals). In all but 2 of these cases the second referee was the GP.

76.1% (482) of referrals gave a diagnosis (Table 2.16). The most frequently referred conditions were cataract (191) and glaucoma (121).

Are referrals from more experienced practitioners better?

During the 4 weeks when additional information about the referee was analysed, 389 GP referrals accounted for 397 conditions which attained a score. 13 GPs could not be identified. Therefore 384 scores and practitioner details were analysed. Scores for each diagnosis were correlated with the number of years that the practitioner had been qualified (Figure 2.23). The score and number of years qualified showed no strong correlation for any of the conditions referred (Table 2.17). The quantity of information included within each letter also showed no correlation with the number of years since qualification. The null hypothesis, that there is no relationship between the quality and quantity of information included in a referral and the year of qualification of the initiating GP, was therefore accepted.

237 OO referrals were received for 260 of the scored diagnoses. The details of 31 OOs were not identified and 229 scores were included in the analysis (Figure 2.24). OOs who qualified before 1960 are listed as 'initial' in the opticians register. In order that calculations could be conducted it was assumed that these practitioners had all been qualified for 38 years. No correlation was found between the number of years a practitioner had been qualified and the 'quality' or quantity of information included within the referral letter (Table 2.18). Once again the null hypothesis, that there is no relationship between the quality and quantity of information included in a referral and the year of qualification of the initiating OO, was accepted.

Other Referral Initiators

79 (0.9%) referrals were received from other hospitals (Figure 2.4). 12 of these referrals requested an LVA examination and 6 patients for second opinion. The most frequent diagnosis specified was cataract (17) and 21 referrals gave no diagnosis. Visual decrease was stated in 38 (48.1%) of these referrals.

Figure 2.24g. OO Quantitative Scores

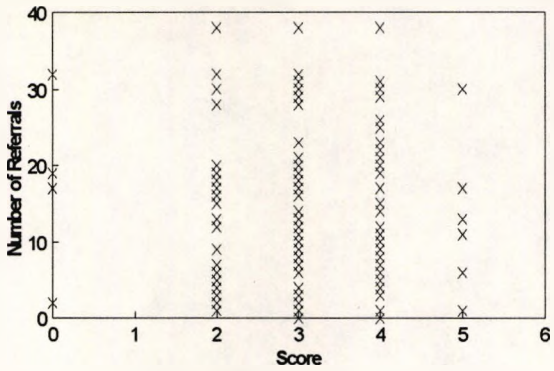


Table 2.16. Referrals from GPs which stated that the patients had seen their "optician" initially

Diagnosis Classification	Number of Referrals
Diabetic Retinopathy	8
Retinal Vascular Accident	2
Maculopathy	52
Retinal Defect	41
Uvea	2
Glaucoma	121
Cataract	191
Refraction and Accommodation	9
Cornea	21
Conjunctiva	11
Eyelids	5
Lacrimal	9
Nerve and Visual Pathway	6
Bin. Vision Anomaly and Squint	28
Vitreous	4
Visual Disturbance	4
Pupils	6
Other	1
Total	521

482 Referrals gave at least 1 diagnosis

No diagnosis was given in 151 referrals

19 referrals were initiated by school nurses. The correspondence of only 5 of these referrals was included with the referrals. 1 referral was not sent by the nurse to the second referee and the other 13 were not enclosed. The most frequently specified diagnosis by the nurse was a binocular vision anomaly or squint; the mean age of referrals was 7 years.

Table 2.17. GP Referrals - Comparison of number of years qualified with "score"

Number of years since practitioner qualified

Condition	Missing	Min	Max	Count	Mean	Correlation
Cataract	2	3	50	130	21.8	-0.04
Glaucoma	0	10	38	8	22.6	-0.52
Macula	0	4	30	5	17.0	
Corneal	0	7	28	7	19.7	0.04
External Eye (Exc. Cornea)	11	0	44	210	20.0	0.13
Binocular Vision Anomalies	0	4	39	24	21.2	-0.25

Table 2.18. OO Referrals - Comparison of number of years qualified with "score"

Number of years since practitioner qualified

Condition	Missing	Min	Max	Count	Mean	Correlation
Cataract	17	0	38	80	14.4	-0.01
Glaucoma	6	0	38	60	12.0	0.04
Macula	0	1	38	40	14.0	0.13
Corneal	1	0	30	13	10.1	-0.23
External Eye (Exc. Cornea)	1	3	38	18	20.6	-0.19
Binocular Vision Anomalies	6	0	38	18	8.7	-0.61

Medical Officers referred patients directly (18) or via the patient's GP (11). Once again, binocular vision anomalies and squints were the most frequently stated diagnosis (8). The median age of patients referred by the medical officer was 8 years.

Other referral initiators included: Occupational Nurse (1), Dispensing Opticians (5), Orthoptists (6), Occupational Doctor (1), Health Visitor (3) and 8 patients were self referrals.

Referral Accuracy

GP and OO referrals with diagnoses were compared with the outcome diagnosis given by

the Ophthalmologist. 174 GP and 141 OO referrals were included in the analysis (Tables 2.19 - 2.21). GP referrals for eyelid conditions were very accurate. Referral accuracy was less for cataract where many referrals were partially correct eg. Immature opacity, secondary diagnosis missed.

Glaucoma suspects correctly diagnosed by OOs (positive or high risk) made up 50% of all those referred (3 missed an additional diagnosis). Cataract referrals, as with the GPs, were often referred too early or additional conditions were missed.

Table 2.21. Referral Accuracy Summary Table

Referee	Yes	No	Partial	Uncertain	DNA	Total	No diagnosis	All Referrals
GP	100	23	42	1	8	174	179	353
OO	60	38	35	3	5	141	37	178
OMP	6	0	0	1	0	12	5	12

OO Glaucoma Referrals

79 OO patients were referred for suspected glaucoma, during the study period. 5 patients failed to attend for their appointments and these referrals were excluded from the study. 17 patients were diagnosed as glaucoma sufferers and 17 were reviewed as high risk patients. 39 (53.4%) patients did not have glaucoma. IOP readings, optic disc description, field assessment, family history and other notes were included in the analysis. These were divided by outcome diagnosis (Table 2.22).

Positive/high risk patients had, on average, higher IOP readings recorded in their referrals ($p=0.029$, t-test, $\alpha=0.05_{1\text{-tail}}$) than patients referred without glaucoma. There were also many more patients diagnosed or at high risk of glaucoma who presented with a difference in IOP of greater than 5 mmHg. There is a much greater correlation (Pearson Product Moment Correlation Coefficient) of the IOP values for left and right eye in referrals which are negative ($r=0.90$), than for positive/high risk patients ($r=0.64$). Patients without glaucoma were on average younger than positive/high risk cases ($p=0.02$, t-test, $\alpha=0.05_{1\text{-tail}}$). The null hypothesis stated initially that there in no relationship between the information included in a glaucoma referral and the accuracy of the referral is therefore rejected.

Table 2.19. Accuracy of Diagnosis - GP Diagnosis

Diagnosis Classification	Yes	No	Partial	DNA	Uncertain	Totals
Diabetic Retinopathy	3	1	1			5
Maculopathy	1		1			2
Retinal Defect	2					2
Uvea		1				1
Cataract	31	3	22	2		58
Cornea		1				1
Conjunctiva	8	5	3	1		17
Eyelids	46	5	6	2		59
Lacrimal	3	4	4	1		12
Nerve and Visual Pat						0
Bin.Vision Anomaly	5	1	2	1	1	10
Pupils		1				1
Other		1				1
Macula & cat.	1		1			2
retinal defect & cat			1			1
cornea & cat.				1		1
conjunctiva & lids			1			1
Totals	100	23	42	8	1	174

174 GP referrals with diagnosis given by GP

179 GP referrals give no diagnosis, 169 give 1, and 5 GPs give 2 diagnoses

61 GP referrals have diagnosis from other source

Table 2.20. Accuracy of Diagnosis - OO Diagnosis

Diagnosis Classification	Yes	No	Partial	DNA	Uncertain	Totals
Diabetic Retinopathy			2			2
Maculopathy	7	7	5	1		20
Retinal Defect	8	7	1		1	17
Glaucoma	16	19	3	1		39
Cataract	17		12	2		31
Cornea	2					2
Conjunctiva	1	1				2
Eyelids		1				1
Vitreous	1					1
Nerve and Visual Pat	1					1
Bin.Vision Anomaly	3	1	2		1	7
Visual Distortion					1	1
Other	1					1
Macula & cat.		1	2			3
Macula & glaucoma		1	1			2
Macula & ret defect			1			1
cataract & diabetic	1		1			2
Rx & Accom.& Bin Vis	1					1
Rx&Accom.& Other	1					1
Cornea & Conjunctiva			2			2
Conj & Lacrimal			1			1
Lids & cataract			1			1
Bin Vis & glaucoma			1			1
Vis Dist & Rx & Acco				1		1
Totals	60	38	35	5	3	141

141 OO referrals with diagnosis

37 OO referrals give no diagnosis, 125 give 1, and 16 OOs give 2 diagnoses

Table 2.22. Comparing Glaucoma Referrals with Positive and Negative Outcomes

	Results recorded in referral	+ve or HR	-ve
Disc	C:D ratio	10	14
	>=0.2 difference	1	
	Mean (R&L)*	0.43	0.40
	cupped - no reading	7	9
	general disc comment	3	1
	colour	3	4
	normal	4	2
	vessel displacement	0	1
	none	12	12
Fields	recorded	9	11
	enclosed	3	1
	full fields	2	6
IOP	Mean RE (mmHg)*	24.89	21.05
	Mean LE (mmHg)*	24.42	20.89
	Time of day	2	1
	Compared with previous readings	2	5
	5 mmHg or > between eyes	13	2
Other	Mean Age (years)*	62.33	54.05
	Gender F:M	1:0.54	1:0.50
	Family History	5	6

***mean values rather than actual number of referrals which contained data**

HR = high risk

Identifying seasonal variation in referral patterns

The number of referrals received each week varied between strata. Significantly fewer referrals were received during the autumn stratum than at other times during the year (χ^2, df=3, p=0.00, Figure 2.3). The greatest number of referrals were received during the winter.

The referred conditions were compared after being grouped by anatomical location. No significant difference was identified between the numbers referred in each category throughout the year (χ^2, df=6, p=0.50, Table 2.23).

Table 2.23 - Condition referred (location) by Stratum

stratum	external	internal	no diagnosis
1	452(19.5)	1127(48.6)	742(32.0)
2	417(19.6)	1023(48.1)	688(32.3)
3	388(20.3)	889(46.5)	636(33.2)
4	413(19.9)	1035(49.9)	625(30.1)

Figures in brackets are percentage values - Totals may not equal 100 due to rounding

Table 2.24. - Gender by Stratum

Stratum	Male	Female
1	959(41)	1362(59)
2	942(44)	1186(56)
3	741(39)	1172(61)
4	899(43)	1174(57)

Figures in brackets are percentage values

Patient populations were also compared between strata. Where age was given, male and female patients were compared but there were found to be no significant differences. (ANOVA, Female: F=0.35, p=0.79; Male: F=0.76, p=0.51). However, there is a significant difference between the number of males and females referred each stratum (χ^2, df=3, p=0.04, Table 2.24).

Because of the large variation in the numbers of referrals by stratum, the null hypothesis that there is no seasonal variation in the pattern of referrals received at MEH was rejected.

2.3.4. Discussion

The study looked at non-designated and redirected designated referral correspondence only. The OPD service within MEH encourages GPs to refer non-designated referrals so patients are seen quickly. Similarly, the PCC in Warrington specifically requests GPs to send non-designated referrals (Peckar et al, 1994). There is no apparent reason to believe that the quality of referrals seen would differ from designated referrals. It has been noted that some Consultants feel that non-designated referrals are more likely to be unsatisfactory (de Alarcon and Hodson, 1964; Long and Atkins, 1974), but these studies provided no real evidence. Williams and Wallace (1974) identified "key items" which

psychiatrists felt should be included in GP referral letters. Those referrals addressed to an individual consultant by name were more likely to contain more "key items" than those that were non-designated.

The 1992 figure for life expectancy for females in England and Wales is 79.5 years compared with 73.9 years for men (WHO, 1994). It would therefore be expected that more female patients were referred than males. As well as a lower life expectancy, the male population was greatly reduced by World War II. It is this generation that is now the elderly male population of today.

Referral Delays

The date recorded on the referral correspondence may not be the date the patient was examined, especially when a referral letter was typed. However, delays within the referral process are unacceptably long. The median value, less affected by the extreme values than the mean, is a preferable average for this type of data. An average two week delay between OO/OMP referral via the GP to MEH is identical to work conducted by Linnell (1995). She felt a two week delay was acceptable. The median waiting time for OO referred glaucoma suspects was 9 weeks from OO referral to outpatient appointment in another study (Tuck and Crick, 1991).

Why the delay occurs is unclear. Does the OO not inform the patient to see the GP? Perhaps the patient misunderstands and is waiting for action to be taken. Not until the patient sees the GP on another matter does any action result. Patients may also be fearful of losing their sight and be afraid to attend the HES. Of particular concern in suspect glaucoma is that asymptomatic patients may feel that further examination is unnecessary. There is presently no safe guard to ensure that patients are not lost from the referral system. This is a weakness in the referral process.

The GP's Role in the Referral Process

The central role of the GP in the referral process was clear; the GP had an input in almost all the referrals seen during the study. Identifying the initiator of the referral was not always easy. For example, many referral forms and letters from ophthalmic practitioners were not included with the GPs correspondence. Examination results were copied and included in the GP's own letter. Many authors have stressed the importance of including the OO/OMPs original letter (Curran, 1992; Linnell, 1995; Tuck and Crick, 1991). If the GP does not indicate the OO/OMP initiated the referral, it was not possible to identify that

a practitioner, other than the GP, had an input. It is also appreciated that GPs may not be identified as initiating OO referrals. Only 27 patients were referred via this route. Frequently GP referrals to an OO are verbal messages sent via the patient (Boggon, 1992). Shute and Jenkins (1993) found that 30% of GPs never refer a patient to an Ophthalmic Practitioner, but 15% do so frequently.

GP referrals consisted largely of patients who were aware that they had a problem with their eyes. They attended their GP because of symptoms or outwardly visible signs. Few GP referrals were for posterior ocular problems, a finding comparable with other studies (Harrison et al, 1988; Jones et al, 1990; McDonnell, 1988). 62% of GPs included a diagnosis in their referral correspondence in this study. This compares well with the analysis of PCC ophthalmic referrals to a Warrington clinic, where 64% of GP referrals gave a diagnosis (Peckar et al, 1994).

Studies within GP surgeries show that much of the ophthalmic work conducted by GPs is for external eye conditions (Dart, 1986; McDonnell, 1988; Sheldrick et al, 1992). Dart (1986) identified that differences between an ophthalmologist's diagnosis and that given by the GPs occurred for specialist areas of external eye disease and medical retinal problems. His study concluded that an ophthalmologist based within a general practice would improve the quality of community ophthalmic care.

A large number of patients were referred to MEH for a second opinion. All NHS patients have this right if their GP agrees (DOH, 1995). It is not surprising that maculopathy features high on this list. Patients suffer from diminished eyesight, often leading to blindness. If the condition is non-exudative there is currently no effective treatment (Kanski, 1989).

Waiting times for the PCC is 4-8 weeks for a routine appointment, and 3-6 months for surgery. Patients are being re-referred by their GP because of long waiting lists at other hospitals.

Referrals for Excimer Laser Photorefractive keratectomy (PRK) were frequently received. The procedure is still experimental and the hospital is conducting clinical trials (MEH, 1994). The technique corrects myopia and astigmatism but is not conducted under the NHS; patients pay for the procedure to be conducted.

Medical and drug history can usually only be supplied by a patient's GP (Duke, 1986) yet it is often not included within the referral. Only one fifth of the direct GP referrals included information about the patient's medication and a similar number added this information to Ophthalmic Practitioner referrals. Other studies have also identified this

inadequacy. In the early sixties, De Alarcon and Hodson (1964) questioned consultants at a London teaching hospital. Information relating to the patient's medication was felt to be the most important information and yet was only included in 22% GP referrals. Jones et al (1990), who studied ophthalmic referrals, identified inclusion in only 13.4%. The best results were recorded in a Northern Ireland study (Addley and Duffy, 1982) which found drug information in 52% referrals to a district general hospital. A patient's present medication may affect the drug regime prescribed to a glaucoma sufferer (BMA and The Royal Pharmaceutical Society of Great Britain, 1995; Franks and Diggory, 1995) and will affect the use of anaesthesia during surgery.

Harrison (1988) stated that GPs rarely conduct fundoscopy, or at least do not report their findings in the referral letter. The referrals to MEH have identified a similar lack of reported internal examination. Jones et al (1990) felt that a referring doctor would be "selective about what is included in a referral letter." Therefore they felt that it should not be assumed that failure to include evidence of an ocular examination indicated that no examination took place. 43.7% GPs in their study gave no evidence of ocular examination. In contrast, Pease (1973) studied referral letters to a general AED. 86 referral letters stated physical findings although the patients did not recollect being examined.

The patient's visual function was also rarely recorded. Smaller studies calculated values of between 3.7% - 19.7% (Jones et al, 1990; Rao and Moriarty, 1995; Talks et al, 1995). Fink et al (1994), in a questionnaire to GPs in Brent and Harrow, identified 31% of GPs who were uncertain of the accuracy of their Snellen acuity testing distance. In addition only 13% reported consistently mentioning VA in their referral correspondence. Pandit (1994) identified an additional problem; most GPs in the Torbay area estimate the distance between the patient and the test chart. Also, none of the 22 practices questioned were aware of the minimum illumination standards required to measure vision.

The scoring protocols were structured by the author and then modified by specialists at MEH. Scoring protocols have been used in the past to quantify OPD referral correspondence (Kentish et al, 1987; Lachman and Stander, 1991; Salathia and McIlwaine, 1995; Williams and Wallace, 1974). All these studies have identified weaknesses in GP referrals. Many GP referrals received at MEH were of a very high standard, but there was a huge variation in standards. Lachman and Stander (1991) conducted a study of referral correspondence in Cape Town, South Africa. They also identified a large variation in the quality of referral letters received. They speculated that

these differences may be due to:

- workload of referral agents.
- lack of understanding on the need for comprehensive details about the patient.
- lack of contact between hospital and referral agent.

De Alarcon and Hodson (1964) identified the GP's workload as a reason for poor referral letters to a London teaching hospital. In addition the fear of derision of GP letters at teaching hospitals was felt to be one reason that GPs were reluctant to include a diagnosis. The divide between the GP and the hospital, especially in London, has previously been identified (LHPC, 1981) and this lack of contact may be a factor in some poor referrals. GPs' years in practice were not related to the quality of the referral. It was hypothesised that perhaps the greater experience of older practitioners, having seen and referred many conditions before, may result in more information being included in their referrals. Alternatively that the more up to date thinking of the younger practitioner could have some bearing on the information included. Possibly the combination of both arguments results in no difference associated with years in general practice.

GP's performance compared with OO's was weak for most conditions. The null hypothesis, stated at the start of this study, was rejected. Should we expect more from GPs? Many GPs do not have the knowledge or equipment to provide much of the detailed information required within the referral criteria. They do however have ready access to much of the general information required.

Jones et al (1990) concluded, in a study into GP ophthalmic referrals, that "undergraduate education in ophthalmology is inadequate and requires more curricular time". GPs and ophthalmologists alike feel that undergraduate ophthalmological training should be extended (RCOphth, 1995; Vernon, 1988) and 80% of GPs in Devon requested informal training sessions in ophthalmology when approached (Featherstone et al, 1992). It has been suggested that the HES should be responsible for much of this continuing education (Rosenthal, 1992). Generally it appears that GPs are enthusiastic to be involved with hospital colleagues in training and educational initiatives (McColl et al, 1994). However, despite a weakness in ophthalmic knowledge, GPs should include in their referrals the information that is easily available to them eg. patients' medical history and drug schedules.

The Ophthalmic Practitioner's Role in the Referral Process

More than one third of the referrals initiated in this study were from the ophthalmic

profession. This was higher than another London hospital, St. Georges in Tooting, which calculated only 27% of referrals from 'opticians' (Lee et al, 1992). This ophthalmic department is part of a large Teaching Hospital where high numbers of patients were referred from other departments (19%). Harrison et al (1988) identified 39.8% of patients who were referred from OOs and OMPs. Jones et al (1990) in Manchester found 51% of referrals initiated by OOs and 49% by GPs; these values excluded AED referrals and internal referrals.

The quantitative measure of referral letter content has obvious drawbacks. It gives no indication of the specific amount of information provided, or its accuracy. Its use in referrals for a large number of very different ocular conditions meant that only a very basic scoring system was devised. However, the analysis offered an illustration of the information the professionals were providing. The OOs generally provided detailed referral correspondence with considerable attention to examination results and tests. The OO quantitative scores were higher than the GP referrals. This is probably due to the availability of ocular examination equipment and depth of ocular knowledge. GP results would have been improved if general health and medication details were more widely included.

The scoring protocol identified a large variation in the quality of referrals received from OOs and OMPs. This was similar to the inter professional variation with GPs. The reasons put forward by Lachman and Stander (1991) apply equally to the Ophthalmic Practitioner. In particular failure to include comprehensive details about the patient may be a particularly important factor. The OO may feel that all that is required is to decide whether to refer or not to refer. Tuck and Crick (1989) identified such cases in their IGA study. Under the Opticians Act (1989), where the OO transfers responsibility of the patient to their GP, this is the requirement. However, the COptom guidelines (COptom, 1991) state that the referral must give as much information derived from the eye examination as possible. It was identified earlier that examination and test results aid the prioritisation of the outpatient's appointment (Curran, 1992; Harrison et al, 1988; MEH, 1992; Talks et al, 1995).

The fact that there is no difference in the quality of referrals between older and younger OOs is perhaps more surprising in Optometry than among the GPs. Older members of the profession would not have needed a degree to qualify for Optometry which was introduced in 1965. The new students entering Universities in recent years have been required to reach high standards of academic achievement. In addition some experience

within a hospital setting is now required as part of the pre-registration year. This was introduced to improve the Optometrists understanding of pathology. However, Optometry has changed in other ways, becoming a much more commercialised profession and this may have changed the thinking of the younger Optometrist. Greater experience of the older professional is clearly matching the higher academic standards of the young. The null hypothesis that there was no relationship between number of years qualified and the quality of referral correspondence was accepted.

The importance of the OO in referring patients with glaucoma was very evident and has been appreciated elsewhere (Brittain et al, 1988; Clearkin and Harcourt, 1983; Gillie, 1982; Harrison et al, 1988; Linnell, 1995: Tuck and Crick, 1991). The importance has been stressed of the need to conduct three examinations to identify glaucoma: optic disc examination, IOP readings and visual field assessment (Hitchings, 1993; Tuck and Crick, 1993; Linnell, 1995). Most OOs included information about the IOP, but only 60% commented on the optic disc appearance. Field examination is generally not tested routinely and only 26% glaucoma referrals included details of this examination. Harper and Reeves (1995) stressed the importance of the routine implementation of field screening of patients over 40 years and those who are otherwise at higher risk of developing POAG.

Comparing positive and negative glaucoma referrals identified differences between the referral criteria. Higher pressures, older patients and greater differences between the IOP in each eye were more likely to result in a correct diagnosis.

There was no significant relationship between the proportion of referred patients with a family history of glaucoma and those who were finally diagnosed as having the disease. Family history has been identified as increasing the likelihood of glaucoma in a relative (Hitchings, 1980; Miller and Paterson, 1962). However, Tuck and Crick (1996) identified that the majority of patients found to have glaucoma through optometric referrals had no family history of the disease.

The inclusion of examination results as the only reason for referral was surprisingly high in this study. This may be explained by the 'case finding' nature of an eye examination where many examinations/tests can produce unexplained results.

42.8% of GPs added information to OO referrals. Half of OO referrals in a Scottish study had additional information from the GP (Kljakovic et al; 1985) compared with only 35% OO referrals to the Manchester Royal Eye Hospital (Jones et al, 1990). The gatekeeper role of the GP (Perkins, 1990) offers the opportunity to enhance the referral with medical,

ocular, family and drug history (Duke, 1986). The low GP input seriously questions the continuing need for the patient to consult the GP before HES referral. Direct referral would also save GP consultation time.

The 77 OO direct referrals comprised one fifth referrals apparently intended to be seen by the GP initially. It can only be assumed that the patient took steps to initiate this direct referral (see also AED referrals - Chapter 3). Such action may be due to a lack of confidence in the GP, lack of time to make or attend a GP appointment, a perception that the GP appointment would be unnecessary or a wish to expedite the outpatient appointment. The latter may be a factor in some referrals, but the long delay in these patients sending the referral to MEH perhaps suggests other reasons.

Very few referrals were received from OMPs during the study. This appears not to reflect the numbers of OMPs who practise throughout the region, but it is difficult to make such assumptions based on insufficient data. OMP referrals may be directed to other hospitals in the region. Other OMP studies have generally shown that OMPs refer a greater proportion of patients than OOs (Claoué, 1988; Tuck, 1988a).

OMPs are more likely to give a diagnosis in their referral letter compared with OOs. Many OOs are still reluctant to offer a diagnosis within their referral letter despite advice from the COptom (COptom, 1991). The 'standard' of OO referrals equates to the OMP's referrals.

The Role of other Referees

Orthoptists, Health Visitors, Medical Officers and School Nurses frequently initiate referrals of children. It is likely that the role of these professionals is greater than has been expressed in this study. These professionals are felt to play a vital role in screening children's vision. They probably refer patients to the GP or for further tests by an optometrist.

The Need for Change

The present ophthalmic process may not be operating to the benefit of all patients. Delays, inadequate information provided within referral correspondence, unnecessary referrals and break down in communication, are not beneficial to the ophthalmic care of the patients. While some members of all professions are sending high quality correspondence with all the relevant information and results enclosed, others fall well below what should be considered acceptable.

For the Primary and Secondary Health Care Sectors to provide quality ophthalmic care, good cooperation among all health professionals is paramount. The responsibilities and expected 'expertise' of the GP cannot continue to increase. The NHS and GPs themselves, must accept their limitations. Where the GP can be expected to succeed under present arrangements is by functioning as an effective intermediary between the primary and secondary sectors. The GP should be expected to provide a full picture of a patient's medical and drug history where appropriate. The GP should ensure that any ophthalmic history of the patient is made known to the HES and any general medical tests conducted prior to referral. Referral initiators need to be acknowledged and their correspondence enclosed.

At present the added value of OPD referrals being sent via the patient's GP is low. If sight-threatening conditions alone were sent directly to the HES, many GP surgery appointments would be redundant.

Ophthalmic Practitioners have an important role that is not always fulfilled. All relevant information must be included when making a referral. Correspondence needs to be dated and patient details included in full. The inclusion of a diagnosis, which the OO/OMP is in a good position to establish, aids any decision made by the GP.

Good referral correspondence is important mainly to aid appointment prioritisation. Clearly written referrals, setting out relevant information, are quicker and easier to read and allow the ophthalmologist to make an assessment of the urgency of the case.

Will good referral correspondence save clinic time? Certainly a clearly set out referral identifying the patient's main problems and associated symptoms should help to give the ophthalmologist an informed background to the patient's problem. A detailed medical and drug history will provide a good source of reference if problems do arise or drugs are prescribed. It is unlikely that the inclusion of test results will save time during the HES appointment; the use of standardised tests within the hospital setting are important.

The use of computers within GP practices is widespread (Pringle, 1990; Purves, 1996) and OOs are similarly equipped. The introduction of the 'information superhighway' will undoubtedly change the referral process. Direct computer links between OOs and OMPs with GPs and the HES would prevent delays. However, without good 'quality' referrals, little improvement will be forthcoming. Action should be taken, at both local and national level, to ensure that improvements are achieved. The need to improve the process is vital and patients' eyesight should not be placed at unnecessary risk.

2.4. Referrals to The Birmingham and Midland Eye Hospital - A Comparative Study

2.4.1. Introduction

The main referral study was based in London and the problems faced by basing a study in the Capital have been outlined previously (see 2.3.1). Ideally a study comparing the referral patterns between hospitals in rural and urban sites throughout the UK should be considered, but resources and manpower prevented such comparison. Extrapolating any results beyond the geographical area in studies of this type is an exercise that requires care (Roland, 1992a) and this was considered when the studies were analysed.

2.4.2. Setting

The Birmingham and Midland Eye Hospital (BMEH) was chosen as the site to repeat the referral study. It was felt important that the comparison should be conducted in an Eye Hospital and not an Eye Department of a General Hospital. The latter has been shown to produce different referral patterns (Lee et al, 1992) due to referrals within the hospital (Burkey et al, 1995). Very few eye hospitals are run as separate units. Examples include Birmingham, Manchester and Bristol. Individual Eye Hospitals are frequently moving to become part of large sites eg. Southampton Eye Hospital moved to become part of Southampton General Hospital in April 1994.

There are good links with BMEH and MEH, and in addition the author had previously undertaken pre-registration training at the hospital. Familiarity with the site and many of the staff, made planning the study easier and public transport links between the two cities are very good. The hospital management were also supportive of the project.

Birmingham is not without its health problems (Maxwell, 1993) but the primary care sector, even within the inner city areas, is considered to be of a higher standard than is seen within the capital (Jarman and Bosanquet, 1992).

Located in Birmingham City centre, The Birmingham and Midland Eye Hospital (BMEH) provides an ophthalmic service for the whole of the West Midlands. It was established in 1824 and has been on its present site, in Church Street, since 1884 (Wallwork, 1973). The hospital is undergoing considerable change with plans to move to a new site by the end of 1995.

Both Birmingham and London are centres for optometric training within the UK, at Aston and City Universities respectively. Each optometry department takes advantage of the expertise of the local eye hospital for the benefit of students. Both eye hospitals conduct

much postgraduate ophthalmic medical training and research, and are accredited training hospitals.

At the time of the studies MEH was a Special Health Authority funded directly by the Department of Health. In comparison the BMEH, as a combined hospital unit with the Dudley Road General Hospital, was a Trust Hospital tendering for contracts from the district health authority and local fundholding GPs. A further difference between the hospitals is their size. BMEH has 8 consultant ophthalmologists (Appendix VI) who provide services not only within the BMEH but also at other eye departments around the Birmingham and West Midlands area. This compares with the 36 Consultants providing care at MEH. The average waiting time for initial consultation varies considerably. A first appointment is available within 4-6 weeks for a routine case and up to 1 week for more urgent outpatient referrals at the PCC, MEH. At BMEH the appointment allocation depends on the designated consultant and waiting times are between 6 and 9 months. Since the study was conducted the waiting time for a first outpatients clinic appointment has been reduced to between 2 and 11 weeks (July 1995).

2.4.3. Pilot study

Aims

The study aimed to establish a protocol for a comparative study to be conducted at the Birmingham and Midland Eye Hospital (BMEH).

Method

The BMEH keeps no records of the number of designated and nondesignated referral letters received. The proposed study period was to coincide with the MEH study 'summer' strata covering 30th May 1994 - 26th August 1994. Six data collection weeks were selected at random. The first data collection week was 6th June 1994 and the two preceding weeks were designated for this pilot study.

The data collection form used for the main MEH study was modified. In addition:

1. A score was given for the legibility of the referral correspondence.
2. Where there was more than one referee, the referee who gave the patient's date of birth was recorded.
3. The category 'support service' was expanded to take account of referrals requesting field examinations and electrodiagnostic testing. These referrals are not received at the PCC at MEH.

All information was collected onto a database (Appendix VII).

Results

12 non-designated referral letters were collected over the two-week period. 1 referral was received from a GP, 8 were initiated by an OO and sent via the patient's GP, and a further 2 referrals were clearly initiated by the OO but the referral letter was not enclosed in the GP reports (Table 2.25).

Table 2.25. Reasons for Referral

Initiator	Reason for Referral	f
OO	Cataract	5
	Corneal	1
	Glaucoma	3
	Maculopathy	1
	Reduced vision	1
GP	LVA assessment	1

Discussion and Conclusions

The number of non-designated referrals received at the BMEH was low. Many consultants have held their current position for many years and provide ophthalmic care throughout the West Midlands area and at private clinics. A different relationship appears to exist between the local GPs and hospital consultants, than in London.

Six non-designated referrals each week would not provide a large enough sample to compare with the London study. The proposed sampling strategy was therefore changed to take account of all referrals received at the BMEH whether designated or non-designated. Permission to extend the study was required and the study was moved to a six-week period from 16th July to 27th August 1994 inclusive.

2.4.4. Referrals to Birmingham and Midland Eye Hospital

Method

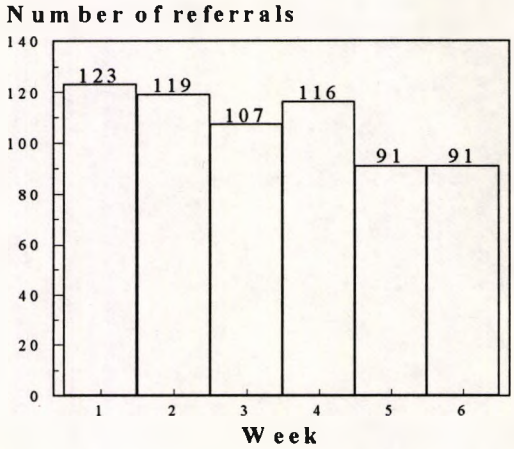
All referral letters received at the Birmingham and Midland Eye Hospital between 16th July and 27th August 1994 were included in the study. At the BMEH all the referral letters are processed via the contracts department. The referral letters were intercepted

at this point for scrutiny and data was entered onto a PC database (Appendix VII).

Results

647 referral letters were received during the study period. Only 42 of the referrals were non-designated (6.49%). Between 91 and 123 referrals were received each week (Figure 2.25) and the referral routes were identified (Figure 2.26).

Figure 2.25. Weekly Referrals



Key

1. 16th to 22nd July
2. 23rd to 29th July
3. 1st to 7th August
4. 8th to 12th August
5. 13th to 19th August
6. 20th to 26th August

The patient's age and sex were recorded (Figure 2.27). Very few children were referred, but large numbers of patients in the older age group categories. The mean age of male patients was 53.47 yrs (s=22.20, Mdn=57.50 yrs, $s_{\bar{x}}$=1.30) and 55.47 yrs for females (s=24.07, Mdn=61 yrs, $s_{\bar{x}}$=1.32); the differences in age were not significant (p=0.28, t-test, $\alpha=0.05_{2\text{-tail}}$). The distribution shows that more patients aged 20-35 years (male and female) were referred compared with slightly younger and slightly older patients. The most frequent diagnostic category for these patients was eyelid problems.

22 referral letters gave no age or date of birth of the patient. This group included: 2 GP direct referrals, 1 each from an OO and an OMP, 2 from other hospitals and 1 from a DO via the GP. The largest group (15) were referred from OOs via the GP and all but one of these referrals were made on the new GOS 18 form. 59 further OO referrals gave no date of birth, but the GP included the information on his/her referral correspondence.

Delays

OO to GP referrals, where dated, were analysed (Table 2.26). OO referral initiators were more likely to send undated correspondence than GPs (χ^2, df=1, p= 0.00). 62 (27.07%)

Figure 2.26. Referral Routes

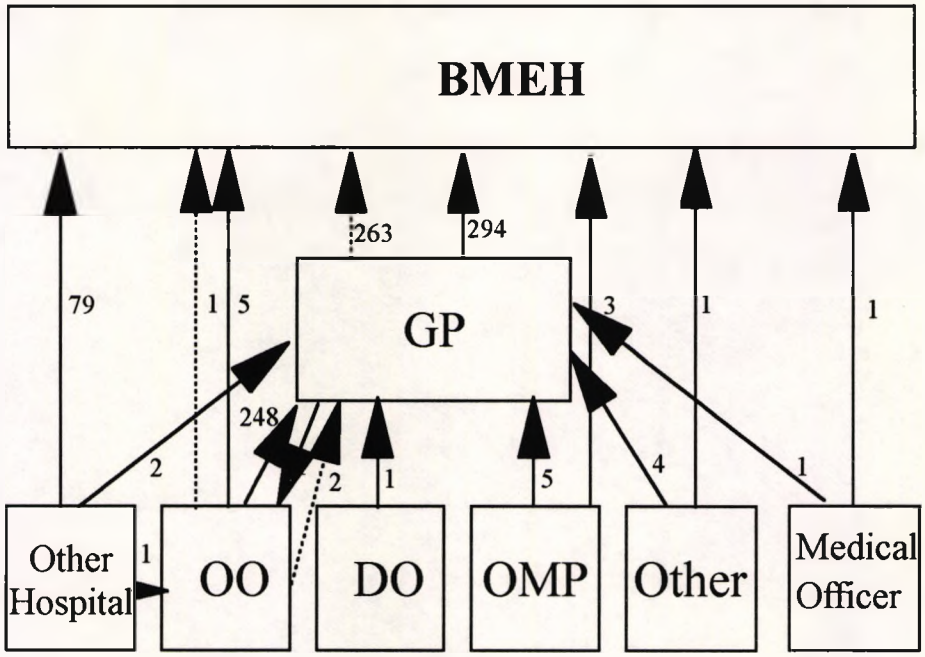


Figure 2.27. BMEH - Age/Sex Distribution

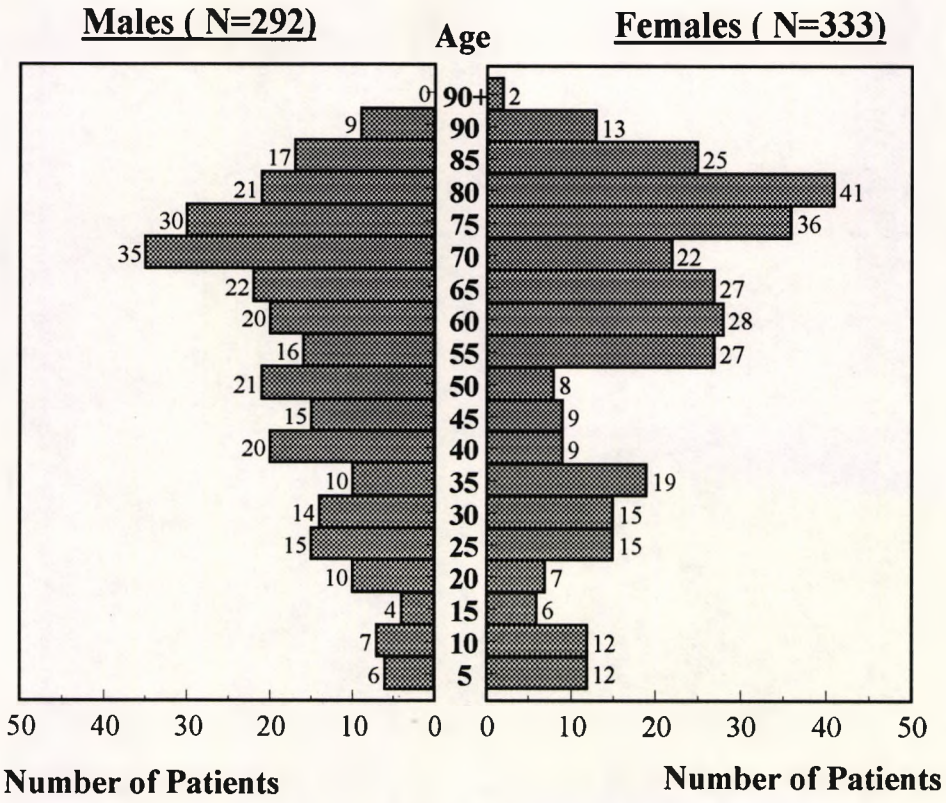


Table 2.26. Referral Delays

Interval	Min	Max	$\bar{x}$	s	$s_{\bar{x}}$
OO to GP	0	462	20.74	49.55	4.25
GP to BMEH	0	152	5.94	11.85	0.82
OO to GP to BMEH	0	469	24.48	47.07	3.66

units = days

OO and 6 (2.04%) GP initiated referrals were undated. GPs were less likely to date referrals when they were the second rather than the first referee (χ^2, df=1, $p=1x10^{-6}$); 15.2% of referrals were undated compared with 2.04% (6/294) of the GP initiated referrals enclosed.

The new GOS18 form was undated more often than all other OO correspondence (χ^2, df=1, $p=1.1x10^{-5}$); 38.73% of new GOS18 forms were undated by OOs compared with 8.05% other OO correspondence.

GP Referrals

294 (45%) patients were referred from their GP (Figure 2.26). GP referral forms were used for almost three quarters of these referrals (Figure 2.28) and the majority of referral letters (77.4%) were typed (Figure 2.29). 72.1% (212) of GP referrals included at least one diagnosis (Table 2.27) although another practitioner contributed a diagnosis in 65 referrals eg. previous HES appointment. The GP was an important source of cataract, and binocular vision anomaly/squint referrals (Figure 2.30).

Figure 2.28. Referral Correspondence

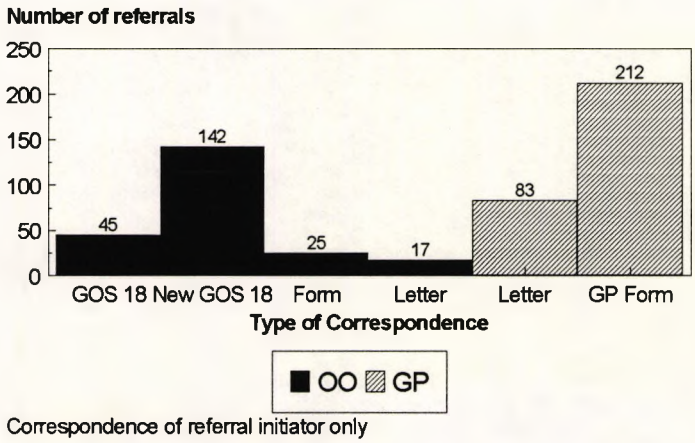
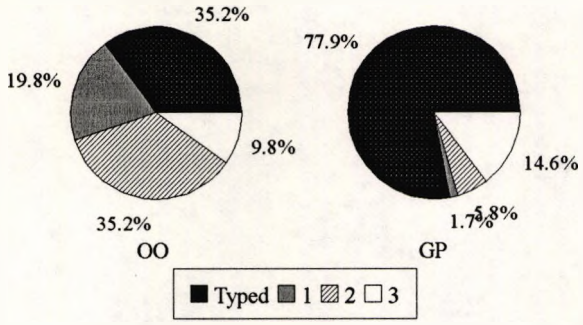


Figure 2.29. Referral Correspondence Legibility



Score	Criteria
1	If the text was read without difficulty
2	If 1-2 words were difficult to distinguish
3	If 3 or more words were difficult to distinguish

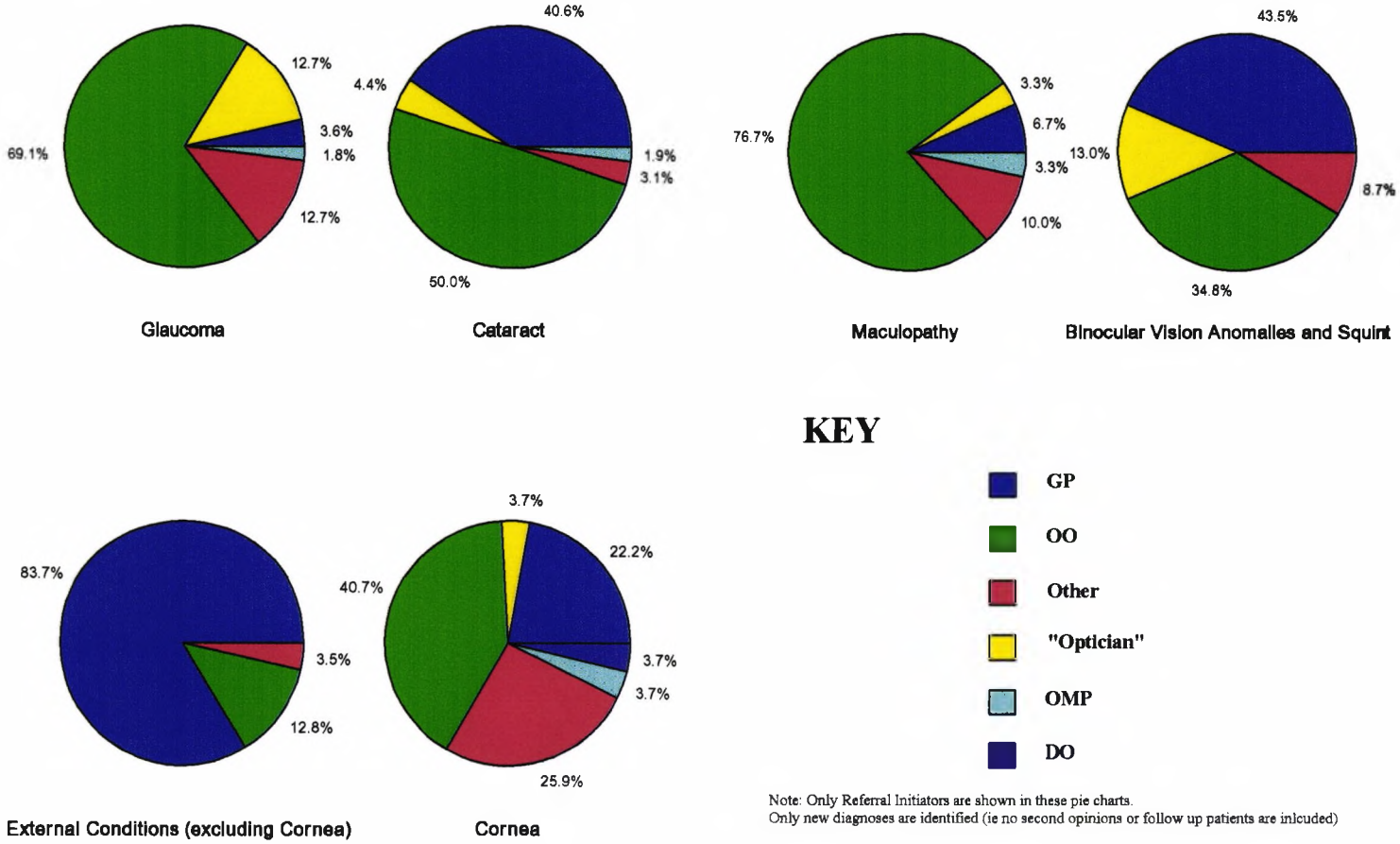
Table 2.27. GP Diagnosis

Diagnosis Classification	GP	Other*	Totals
Cataract	57	22	79
Conjunctival abnormality	13	3	16
Eyelids	53	3	56
Glaucoma	1	7	8
Maculopathy	1	7	8
Lacrimal system	6	1	7
Binocular Vision Anomalies	6	9	15
Cornea	4	8	12
Other	9	10	
No diagnosis	82	-	82
Totals	232	70	302

Note : 8 referrals gave two diagnoses

*** 'Other' indicates a diagnosis given by another practitioner not involved in the referral eg. diagnosis made by an ophthalmologist at a previous outpatients appointment.**

Figure 2.30 Referral Initiators by Main Diagnosis Classification



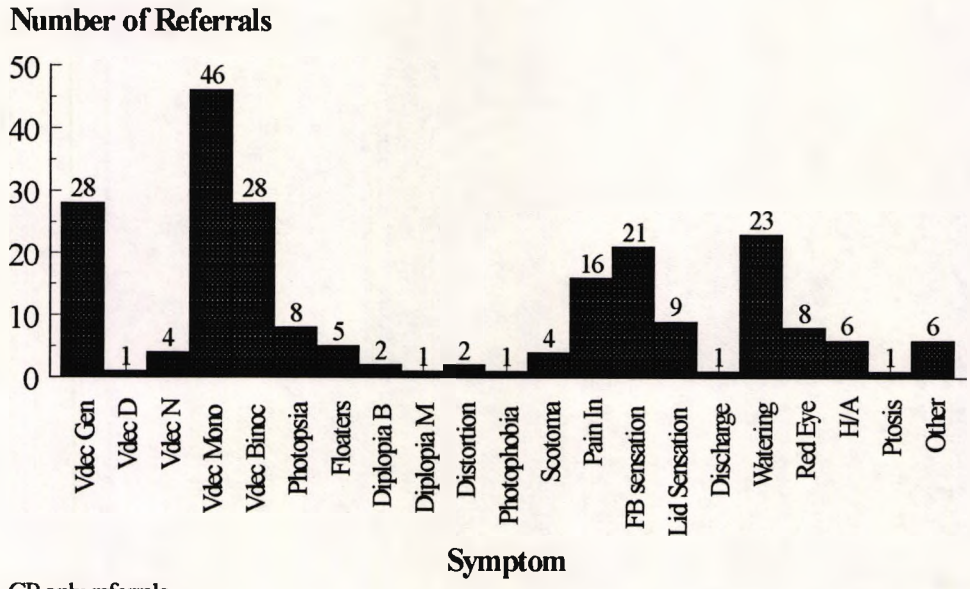
Note: Only Referral Initiators are shown in these pie charts.
Only new diagnoses are identified (ie no second opinions or follow up patients are inlcuded)

Cataract referrals formed the largest group referred by GPs (26.9%). Of the cataracts identified by GPs (57), an examination of the lens was recorded in 48 referrals (84.2%) and 16 included a description of the opacity. Eyelid problems were frequently referred by GPs (19.0%). The location of the defect was reported in 94.6% of these referrals.

64 GPs requested an 'operational service'. The modal group was a request for a follow-up appointment (47). 19 referrals without a diagnosis requested an operational service. Only 6 GPs requested a support service; 3 of these referrals offered no diagnosis.

61.2% of all GP referrals stated patient symptoms (Figure 2.31) . In 53 referrals symptoms were the reason for referral. Although reduced vision was the most frequently specified symptom, visual acuity or vision for distance was recorded in only 8 (14.0%) of these referrals.

Figure 2.31. GP Referrals - Symptoms



GP only referrals
25 GPs stated 2 symptoms and 10 stated 3.

7 referrals contained no diagnosis, no service request, and stated none of the patient's symptoms; 5 GPs reported patient health or drug history and 2 contained no categorised referral information.

41.8% (123) of GP referrals reported the patient's past medical history. Fewer gave details of the patients current medication (19.7%), general health (19.4%), previous medical history (16.3%), family history (3.4%), or the onset/duration of the problem

(16.0%). The urgency was indicated in only 2.3% of referrals and 9.2% of GPs stated that they had prescribed medication for the ocular condition.

Test and examination results were infrequently reported by GPs (Table 2.28). The scoring protocols were applied to the data. Results were compared with OO referrals (Figure 2.32).

Ophthalmic Practitioner Referrals

229 OO referrals, 5 OMP referrals and 1 referral from a DO were received (Figure 2.26). 24 referrals from GPs were identified as having been initiated by an ophthalmic practitioner but no ophthalmic correspondence was enclosed; the GP stated that he/she had received no correspondence for 2 of these patients.

Ophthalmic practitioners initiated 83.6% of glaucoma suspects and 83.3% of patients with suspected maculopathy (Figure 2.30). The majority of referrals were made via the patient's GP (Figure 2.26).

Scoring protocols were applied (Figure 2.32). OO results were higher than GPs scores for cataract referral ($p=9.3x10^{-5}$, t-test, $\alpha=0.05_{1\ tail}$), but small sample sizes prevented other comparisons.

OO Referrals

OO referrals via the GP

224 OO referrals were directed via the GP (Figure 2.26). The new GOS18 form was more frequently used than other formats (χ^2, df=1, p=0.01). Only 42.6% of GPs completed the required section on this form; other GPs submitted a standard referral form or letter.

Cataract was the most frequent condition referred from an OO via the GP to BMEH (Table 2.29). No diagnosis was given by the OO in 33 referrals (14.7%). This was significantly less than GP direct referrals, even taking account of diagnoses given by other professionals (χ^2, df=1, p=0.005).

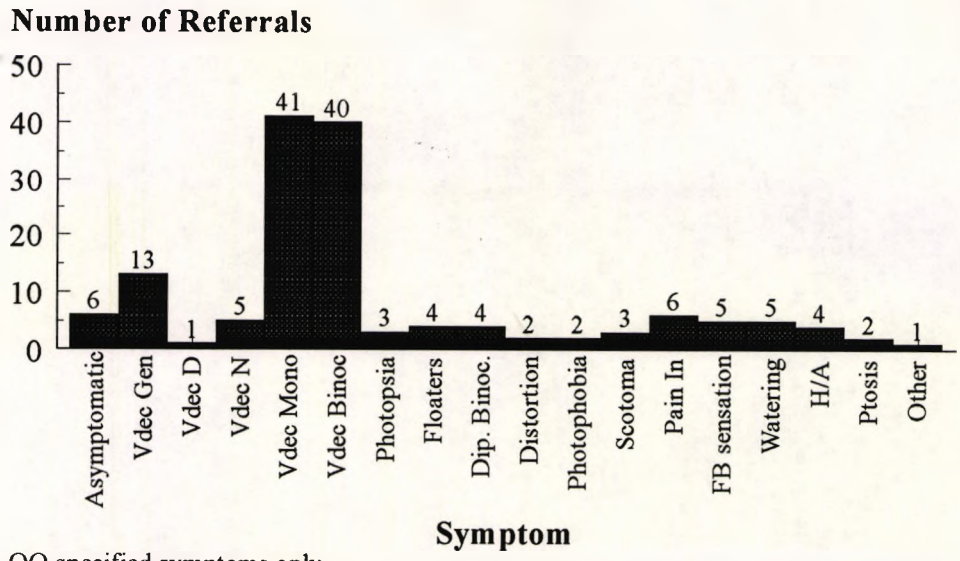
206 OO referrals stated at least one symptom from which the patient was suffering and 6 OOs reported that the patient was asymptomatic. A diagnosis of cataract typically causes symptoms relating to decreased vision. 66.2% of cataract referrals described the effect of reduced vision. Of the 35 patients referred for glaucoma only 7 were symptomatic. 147 OOs stated symptoms in their referrals where no diagnosis was given (Figure 2.33).

Table 2.29. OO Diagnosis (referrals via GP)

Diagnosis Classification	OO
Cataract	84
Conjunctiva	3
Eyelids	3
Glaucoma	44
Maculopathy	24
Lacrimal system	4
Binocular Vision Anomalies/Squint	9
Cornea	12
Diabetic retinopathy	9
Retinal Vascular accident	3
Retinal defect	20
Refraction & Accommodation	3
Optic nerve & visual pathway	1
Vitreous	6
Other	2
No diagnosis	33
Totals	260

Note : 22 referrals gave 2 diagnoses and 1 gave 3.

Figure 2.33. OO Referrals via GP - Symptoms with no diagnosis



OO specified symptoms only
8 OOs state 2 symptoms and 3 state 3.

Referral correspondence often contained the results of examination and investigation (Table 2.28). 97.5% of cataract referrals specified the visual acuity. 95.0% of cataract referrals also reported that an examination of the lens was conducted and 34.2% of OOs described the opacity. All OOs gave details of one or more examinations conducted, and 46.8% gave 6 or more results.

37 referrals were for suspected glaucoma. All but 1 OO gave an IOP reading and all but 2 recorded the VA. An examination of the optic disc was conducted and recorded by 81.1% of OOs although only 32.4% of OOs gave visual field results. A visual field plot was enclosed in just under half of these referrals (41.7%).

All OO referrals for maculopathy gave a VA, and all but 1 gave details of the findings of macula examination. Amsler tests were reported for 2 patients and 9 reported the degree of visual decrease. Only 2 OO referrals via the GP gave no diagnosis or symptoms. Both referrals were unexplained examination findings.

Information/examination results added by the GP were identified. (Table 2.30).

Table 2.30. Information Added to OO Referrals by the GP

GP data	No. of referrals
Diagnosis	10 (4.0%)
1 symptom	30 (12.1%)
2 symptoms	1 (0.4%)
Ocular health/history	14 (5.7%)
General health	70 (28.2%)
Previous medical history	56 (22.6%)
Medication	64 (25.8%)
Urgency	7 (2.8%)
Family History	10 (4.0%)
Prescribed medication for present condition	1 (0.4%)
Onset/Duration	3 (1.2%)
Allergies	0
Tests - 1	11 (4.4%)
Tests - 2	8 (3.2%)
Tests - 3	1 (0.4%)

The total number of GPs adding additional information to OO referrals was 125 (50.4%).

OO only referrals

5 OO referrals were sent directly to BMEH; 2 were addressed to the patient's GP. All 5 patients had previously been treated at BMEH and 1 patient was rereferred for capsular thickening following cataract extraction. The other 4 patients were considered to have previously undiagnosed conditions.

OMP Referrals

5 OMP referrals were directed via the GP and 3 were referred directly (Table 2.31)

Table 2.31. OMP Referrals to BMEH

Pathway	Diagnosis Class	Symptoms	Old Pt	Urgency	GOH	Tests
via GP		V.dec. Bin.			Yes	VAD,Disc
via GP	Maculopathy	V.dec.Mon.				Rx,VAD,VAN,Disc, IOP,Mac
via GP	Cataract	N/S				VAD,lens exam.
via GP	Cataract	V dec.		Yes		Rx,VAD,lens exam.
via GP	Cataract	V dec. Bin				Rx, VAD,lens exam.
direct		H/A			Yes	VAD,Macula,Fundi
direct	Glaucoma	N/S	Yes		Yes	IOP (no value)
direct	Cornea	N/S			Yes	Cornea,location

DO Referrals

1 referral was received via the patient's GP from a DO. The referral was for a corneal problem. No symptoms were reported.

Other Referees

2 medical officers were responsible for initiating referrals, 1 via the GP and 1 directly to BMEH. The former was a cataract referral and the latter requested dyslexia tests.

82 referrals were initiated by other hospitals. 2 were referred via the patient's GP, and 1 via an OO and the GP. 79 referrals were sent directly to the BMEH. 31 referrals were for second opinions, 1 was for a follow-up and 47 were for further investigations eg. electrodiagnostic investigation, perimetry or other specialist techniques.

5 referrals were initiated by other sources eg. social workers, a school teacher.

2.4.5. Comparing the Results of the MEH (summer stratum) and BMEH studies

Taking the patient populations referred to each hospital as a whole, OO and OMP initiated referrals, as well as referrals from other sources, made up a greater proportion of the referrals than in London. The GPs referred a greater proportion of patients to MEH. This difference was significant (χ^2, df=2, p=0.00, Table 2.32).

There was no significant difference between the proportion of initiators for each of the main diagnosis categories referred (Table 2.33).

Table 2.32. Comparing Referral Initiators

Referral Initiator	BMEH	MEH summer stratum
GP	296 (45.80)	1364 (64.10)
OO/OMP	261 (40.34)	716 (33.65)
Other	90 (13.91)	48 (2.26)

Figures in brackets are the percentage of referral received.

Table 2.33. Comparing Referred Conditions

Hospital	BMEH			MEH (Summer)			
Referee	GP	OO	Other	GP	OO	Other	P*
Glaucoma	2	46	7	10	129	1	0.38**
Cataract	65	90	5	214	203	5	0.26
BV/Squint	10	11	2	45	33	9	0.98
Corneal	6	13	7	11	33	3	0.28
Maculopathy	2	25	3	31	78	1	0.60**
External	72	11	3	305	31	3	0.44**

***Chi-square test**

****df=1, distributions with 2 sets <5 were combined**

Only newly diagnosed conditions were included in the analysis (no second opinions or follow-up patients)

The gender ratio referred to each hospital was not significantly different (χ^2, df=1, p=0.30, Table 2.34). However, male patients seen at BMEH were on average older than MEH males (p=0.005). There was no significant difference in the age distribution of female patients (p=0.22).

Referral correspondence was compared for OO and GP referral initiators (Table 2.35). In London more GPs used the letter format, whereas in Birmingham the form was preferred (χ^2, df=1, p=0.00). OO referral correspondence also differs between the two areas (χ^2, df=3, p=0.00 - new and old GOS18 categorised separately, χ^2, df=2, p=0.00 - one GOS18 category). More OOs referring to BMEH use the GOS18 (new and old) than their London colleagues.

Table 2.34. Referred Populations - Age

	BMEH		**MEH**	**(summer)**
	Female	**Male**	**Female**	**Male**
$\bar{x}$	55.47	53.47	54.35	49.51
s	24.07	22.20	23.57	23.01
$s_{\bar{x}}$	1.32	1.30	0.70	0.76

Units = years

Table 2.35. Comparing Referral Correspondence - Referral Initiators

Hospital	**BMEH**		**MEH (summer stratum)**	
Referral Initiator	GP	OO	GP	OO
old GOS18	-	45(19.7)	-	239(46.6)
new GOS18	-	142(62.0)	-	53(10.3)
Form	212(71.9)	25(10.9)	284(20.9)	112(21.8)
Letter	83(28.1)	17(7.4)	1075(79.1)	109(21.2)

Percentages are bracketed, but may not equal 100% due to rounding

Comparisons were made between scores where N>25 referred patients (Table 2.36). The only significant difference in scores was for OO glaucoma referrals; the BMEH OOs scored on average higher marks. OOs conducted all three of the main glaucoma tests: IOP, disc examination and field test results in only 18/95 (19%) glaucoma referrals,

Table 2.36. Comparing 'scores'

Condition and Referee	BMEH $\bar{x}$ ($s,s_{\bar{x}}$)	MEH* $\bar{x}$ ($s,s_{\bar{x}}$)	p**
Cataract GP	2.11(1.68,0.22)	1.96(1.27,0.10)	0.25
Cataract OO	3.08(1.27,0.14)	2.97(1.21, 0.10)	0.27
Glaucoma OO	2.59(1.21,0.20)	1.89(1.51,0.13)	0.005
Maculopathy OO	5.60(1.71,0.34)	6.19(1.97,0.25)	0.10
External GP	1.90(0.97,0.12)	1.84(1.20,0.07)	0.34
Content GP	2.73(1.16,0.07)	2.64(1.03,0.03)	0.11
Content OO	2.68(0.68,0.04)	2.69(0.77,0.03)	0.41

***summer stratum, **t-test**

compared with 13/37 (35.14%) BMEH OO referrals. The difference was not significant (χ^2, df=1, p=0.28).

The study rejects the null hypothesis that there was no difference in the quality of referrals between the two hospitals. As has been shown, the BMEH OOs scored statistically higher marks for their glaucoma referrals. In addition, referral patterns differ considerably between the two hospitals. The proportion of referees differs, the age of the male patients referred and the referral format of the correspondence. The study therefore also rejects the null hypothesis that there is no difference in referral patterns between the two centres. However, there was no difference in the quantity of information included in the referrals received at each hospital and the null hypothesis is accepted in this case. This was despite the fact that many more BMEH practitioners use referral forms.

2.4.6. Discussion

The results confirm the pilot study findings that very few non-designated referrals are received at BMEH. One of the greatest differences between the two hospitals was the designation of referral letters. It may be due to the size of the hospitals. As BMEH is a

much smaller unit, with few consultants, a closer relationship between local GPs and the HES Consultants has developed. Further, the nature of the MEH Clinic structure, with the PCC conducting initial assessments, eliminates the need for referral letter designation. The BMEH age/sex pyramid was 'top heavy' because of age related ocular conditions. A greater number of female than male patients were referred, following the patterns at MEH. The male population referred to BMEH was statistically older than the MEH male population. This may be explained by population statistics for the areas. 5.71% of males in the greater London area are of pensionable age, with lower percentages in some of MEH's high referring inner London areas eg. Islington has 5.35% or 4.66% in Haringey. This compares with 6.25% in Birmingham (OPCS, 1994).

Birmingham OOs were more likely than MEH OOs to use the GOS18 form, especially the new format introduced in 1993. It may be that the new form has been accepted by OOs in general as an improvement over the old GOS18 and that even in London the new form is now widely used. It would be necessary to reevaluate the use of this form in London to test this hypothesis. Conducting the MEH referrals in 1993 meant that OOs and FHSAs were still using up their old stocks of the forms and there were problems when the new GOS18 was launched because it was not correctly self carbonated.

The patient's date of birth (or age) should be considered basic information to include in a referral letter (Lachman and Stander, 1991). It is of concern that practitioners were failing to include this information, especially OOs using the new GOS18. This problem may reduce with increased familiarity with the form. Another problem with the use of the new GOS18 was a failure to date the referral. This arises because there is no space for the OO signature to be dated, only the patient signature (Appendix Ib). If the patient does not sign the form, no date is entered. OOs need to be aware of this problem. The date provides valuable information for the hospital consultant trying to prioritise appointments.

Far fewer children were referred to BMEH than were seen at MEH. Ophthalmic services are provided by the Birmingham Children's Hospital and Orthoptic Clinics at many outlying hospital departments and this may have accounted for the numbers. However, the large numbers of 20-35 year old patients did follow a similar trend to that seen at MEH. These included large numbers of lid referrals, as in London, but also many referrals from other hospitals, a trend that was not identified in the capital.

The conditions that GPs refer to BMEH were largely symptomatic disorders (eg. cataract) or external ocular conditions. The pattern was the same at MEH.

GPs frequently gave no diagnosis but stated the patient's symptoms. Trends again were

similar to the MEH referrals. The lack of ophthalmic investigative equipment in a GP surgery inhibits the GP from including many ocular findings. However, measurement of visual acuity at distance and near, and a pinhole acuity are straightforward techniques that are quickly and easily performed. These measurements give the hospital consultant valuable information regarding the referral (Rao and Moriarty, 1995; Talks et al, 1995) and aid prioritisation.

GPs referring to BMEH, as to MEH, failed to include the patient's medical, drug and ocular history. Addley and Duffy (1982) felt that standardised formats improve compliance. The GP form is a good example of such a form (PRL 1-Appendix 1c). However, as at MEH, this was not the case with the BMEH ophthalmic referrals. The large proportion of GPs using forms, does not result in more information being included in referrals. The high use of referral forms by BMEH GP referrals was similar to the patterns of BMEH OO/OMP referrals. The preferential use by GPs of forms to BMEH and the high use of letters in London was an unexpected trend. However, a widespread use of referral forms (called standard letter formats) was also found in a study conducted in Ulster (Salathia and McIlwaine, 1995). It may be that London referrals are atypical of a general trend.

Legibility was felt to be the most important criterion for referral letters (Williams and Wallace, 1974) and typed GP referral letters are now commonly received at hospitals (Roland, 1992b). Jones et al (1990) identified 62.6% ophthalmic referral letters in their study were typed, slightly fewer than the BMEH example. No such classification had been conducted at MEH on the OPD appointments. At BMEH legibility was generally of a good standard. OO referrals were frequently easier to read than those received from GPs.

BMEH received a large number of referrals from other hospitals. It may be that the number was not in reality higher than tertiary referrals made to MEH but is a distortion due to sampling. It seems reasonable to speculate that tertiary referrals are more likely to be designated, especially from other ophthalmological departments. Designated referrals were not included in the MEH study.

At BMEH more referrals were received from ophthalmic practitioners. Established referral patterns may be different between the two cities. It is generally accepted that the primary care infrastructure in London is poorly developed and that the capital relies on much of its care from the hospital-based services (Tomlinson, 1992). Birmingham GPs may be more likely than their London colleagues to refer patients to an OO or OMP

initially. Frequently these referrals, from GP to OO, are verbal (Boggon, 1992) and it is difficult to verify the use of this referral pathway in the present study. In addition, Birmingham patients may be more likely to consult their ophthalmic practitioner initially if they have a visual problem rather than seeing their GP. This later factor is difficult to test. Since April 1989 the only data available for the number of eye examinations conducted is for those conducted under the NHS. It is not therefore straightforward to compare the number of examinations in two areas because the patients entitled to an examination is unknown; entitlement is not solely for those on benefits. However, with this in mind, the numbers of NHS eye examinations conducted per 1,000 of the population in Birmingham, and East London and City HAs were very similar. The figures were 1,741 and 1,739 respectively for 1994/1995 (Government Statistical Service, 1996). This may lead us to speculate that it is not that greater numbers of patients are having eye examinations which is affecting these results.

The "quality" of referrals did not vary significantly between the BMEH and MEH referees apart from OO glaucoma referrals; BMEH OO referrals performed better. This was an unexpected variation. OOs, although receiving their training at six centres throughout the British Isles, receive pre-registration training throughout the country. This training year and the professional examinations are under the control of The College of Optometrists and such national variations would therefore seem unlikely. The difference may therefore be explained by a greater influence from BMEH Consultants on postgraduate teaching, and continuing education and training.

There are differences between referral patterns to MEH and BMEH. The problem with comparing a two-centre study is that it is not easy to identify which referral patterns are typical of any national trend. Further comparisons would be required to assess significant variation. The similarities in referrals to the two centres outweigh the differences. Many of the main findings identified in London have been reinforced with the work that was conducted in Birmingham. Problems clearly identified in the referral process are therefore clearly not restricted to the capital and the conclusions and recommendations stated within this thesis should be seriously throughout the country.

3. OPHTHALMIC REFERRALS TO AN ACCIDENT AND EMERGENCY DEPARTMENT

3.1.Introduction

The majority of NHS AED patients make their own decision to attend (Davison et al, 1983; Fry, 1960; Pease, 1973). This pattern is also true for the ophthalmic emergency service (Bhopal et al, 1993; Chiapella and Rosenthal, 1985; Harris and Fox, 1986; Jones et al, 1986; Vernon, 1983; Wong and Brazier, 1986). Wong and Brazier (1986) found that about one third of the patients in their study were "abusing" the system. In Southampton (Jones et al, 1986) the service provided by the AED was "far in excess of its defined function"; 36% of patients had symptoms for three days or more and 8.6% for longer than one week.

Very little work on referrals to Ophthalmic AEDs has been conducted. Previous work in these departments has largely concentrated on the total patient population attending, with only a brief classification of referred cases (Table 3.1). These studies show considerable variation in the proportion of referred patients attending and regional factors may be responsible for these differences. The nature of local industry, the population age distribution (Jones et al, 1986; Edwards, 1987) and referral protocols drawn up by

Table 3.1. Previous Ophthalmic AED Studies

Authors	n	old/new	year	area	hosp./unit	referrals
Vernon (1983)	7113	new	1981	Bristol	hosp old site	7.28% optician and GP
Chiapella & Rosenthal (1985)	6576	old & new	1981-2	Leicester	unit	30% GP 1% optician
Wong & Brazier (1986)	426	new	1983	London	hosp	18% GP, 2% opt.& industrial nurse
Jones et al (1986)	8092	old & new	1983	Soton	hosp	7.3% GP 0.7% OO
Harris & Fox (1986)	1487	old & new	?	Bristol	hosp new site	17.6% GP 2.3% optician
Bhopal et al (1993)	2068	new	1989	Newcastle	unit	20.5% GP 1.1% optician
Kheterpal et al (1995)	927	new	?	B'ham	hosp	17.4% GP 1.9% optician 0.6% opt.via GP

individual ophthalmic departments (Crick, 1989) will influence local referral patterns. Professional referrals to ophthalmic AEDs, like the OPD, are generated largely by GPs. However, referrals are also received from OOs, OMPs, DOs and Occupational Doctors and Nurses (Kheterpal et al; 1995). Other hospitals may refer patients who require specialist ophthalmic opinions and, in an eye unit within a general hospital, from other hospital departments.

One recently conducted study, published after the present study was concluded, investigated NHS AED ophthalmic referrals in more detail (Kheterpal et al, 1995). Only GP referrals were considered. Social and personal background details, examination findings, and management plans were poorly recorded in the referral letters. The study concluded that between 50 and 70% of these referrals were not felt to be emergency referrals and would have been more appropriately referred to the OPD.

There are no absolute criteria for the definition of an emergency or for whether a patient's symptoms justify an urgent opinion (Davison et al, 1983). However it is generally recognised that the need for an urgent ophthalmic referral arises where, "there is a likelihood of damage to the sight which is preventable if treated, but which will become permanent if left"(Allen, 1991). Examples include retinal detachment, papilloedema, closed angle glaucoma, iritis and keratitis. If there are signs of life-threatening systemic disease found from ophthalmic investigation, then an urgent referral is also required.

General GP AED referrals have been reviewed in several papers (Montalto, 1991; Morrison and Pennycook, 1991; Thurston et al, 1982; Walsh, 1985). The reason for referral to the department was commonly for a second opinion (Pease, 1973; Davison et al; 1983). Montalto (1991) identified many weaknesses in GP referral letters to a large regional hospital AED. He noted that vital signs, regional examination findings and investigation results were just some areas that were poorly represented in the letters. Thurston et al (1982) also concluded that examination findings were frequently missing from emergency referral correspondence. A working diagnosis was another neglected area. The results of several studies have concluded that a standard stylised referral letter would be beneficial (Montalto, 1991; Morrison and Pennycock, 1991; Thurston et al, 1982; Walsh, 1985).

Problems associated with Referrals to AEDs

Inappropriate use of the AED service by patients is widely recognised (Davison et al, 1983; Fry, 1960; Dale et al, 1990; Horder, 1988; Wood and Cliff, 1986), but the problems

of inappropriate usage by practitioners is not widely appreciated. Davison et al (1983) recognised this problem in a general AED in the East End of London. He commented that,

"Some GPs by referring cases which were not accidents or emergencies used the department as a convenient substitute to outpatients." The AED referral means that the patient will be seen quickly, without the need to wait for an OPD appointment. For example, Fry (1960) identified a group of psychiatric patients referred "as a means of avoiding waiting-lists." However, in more recent years, since the implementation of the GPFH system, referral also means that the cost of the appointment is paid for by the Health Authority and not from the GPFH budget (see p.37).

Referral rates to OPD have been shown to vary enormously between GPs (Crombie and Fleming 1988; De Marco et al, 1993; Fertig et al, 1993; Jones 1987; Moore and Roland, 1989; Wilkin and Smith, 1987). In a questionnaire, Morrison et al (1990) asked Glasgow GPs how many patients they might expect to refer to an AED each week. The responses from 98 practitioners were between 0 and 10. Referrals to ophthalmic AEDs would be expected to display a similar variation. The study by Morrison et al (1990) also identified the large variation in GP perception of the duties that the AED service should perform. This factor alone would be enough to account for some variation in referral rates to the AED.

The notion of appropriateness is not always easily defined and this problem was addressed in an earlier chapter (see p.21). Dale et al (1990) questioned AED nurses on what patients they felt would be appropriately treated by an emergency service. They identified a large discrepancy in responses and concluded that even with experienced AED staff the boundary between appropriate and inappropriate use of the service is unclear. In the studies conducted, the notion of appropriateness has usually been established by the casualty officer (eg. Davison et al, 1983).

3.2. Aims and Hypotheses

The Ophthalmic AED at MEH undertakes a 24-hour open access casualty service for ophthalmic emergencies. The department treats an average 50,000 patients each year (MEH, 1993). Patients are registered when they attend and a record is made by the clinic clerk if the patient was referred.

This study aimed to assess the use of the emergency department by referees. The reasons for patient referral and the information provided by the referee to substantiate the referral

were evaluated to aid this assessment.

The general hypothesis, that referrals made to the MEH AED are an appropriate use of this emergency service, were tested. In addition the following hypotheses, in the null form, were tested:

- There is no statistically significant difference in the quantity of information included in a GP referral letter compared with the quantity of information included in a GP referral form.
- There is no statistically significant difference in the quantity of information included in an OO referral letter compared with the quantity of information included in an OO referral form.
- There is no statistically significant difference in the legibility of the AED referral correspondence between the referring professional groups.
- There is no statistically significant difference in the disposal of the AED referrals between the referring professional groups.
- There is no statistically significant difference in the classification of appropriateness of the AED referrals between the referring professional groups.

3.3. Main Study

Method

A retrospective study was undertaken of the patients referred by GPs and ophthalmic practitioners to the MEH AED. A ten week period from 28 August -3 November 1993 was randomly selected. Referred patients were identified from computer records. The identity of the referral initiator was confirmed using the referral correspondence filed with the patient records. Opticians were contacted if it was unclear whether an OO, DO or OMP referred the patient.

Data was collected from the referral correspondence onto a DataEase™ Database based upon the results of the pilot study. Only the details provided in the referral correspondence were included in this study. The diagnosis given in the referral was categorised using a classification based on the International Classification of Diseases (WHO, 1992). Those conditions that may be sight or life threatening, and therefore could be classified as emergencies, were identified.

The diagnosis given by the Casualty Officer (CO) was recorded and compared with that listed in the referral correspondence. Partially correct diagnoses eg. a list of differential

diagnoses where only one was correct, or where an acute diagnosis was missed where another was identified, was given half a mark. As referrals were to an AED, if a non-urgent secondary diagnosis was missed full marks were given.

Additional information was recorded as YES/NO responses. A YES response would not be dependant on the detail, amount or accuracy of the information provided.

To assess the content of each referral letter a scoring procedure was established. As with the OPD study, the factors were equally weighted because of the large number of conditions and types of referrals to be included.

Diagnosis = 1

Symptoms = 1

Additional Information relating to General Health = 1

Additional Information relating to Ocular Health = 1

Test Results = 1

The type of referring practice eg. group practice or GPFH, was not identified because this information is usually not available from the referral correspondence (see p.51) or from the patient records which were also available in this study.

Results

15% (1032) of all patients seen at MEH AED during the study period were referred (Table 3.2.). 8.3% (86) of patient records or referral letters were missing and 1.7% (18) of patients were actually self referrals. 928 patients were included in the study.

Table 3.2. Patients attending MEH AED during study period

Source of Referral	Totals	% Total
Self Referral	6340	85.0%
GP	851	11.4%
OO/OMP/DO	181	2.4%
Other Hospital	48	0.6%
Other	40	0.5%
Total Attendances	7460	100%

The referral pathways were identified (Figure 3.1). The OO referrals were divided into direct OO referrals and those referred via the GP from the OO. In this latter group the OO did not initiate AED referral but, because much of the clinical detail was provided by

the OO, a separate classification was devised. 2 referrals were received from DOS for contact lens related conditions and 7 from OMPs.

The male and female age distributions were bimodal (mode=31 yrs and 63 yrs; mode=27

Figure 3.1. Referral Pathways

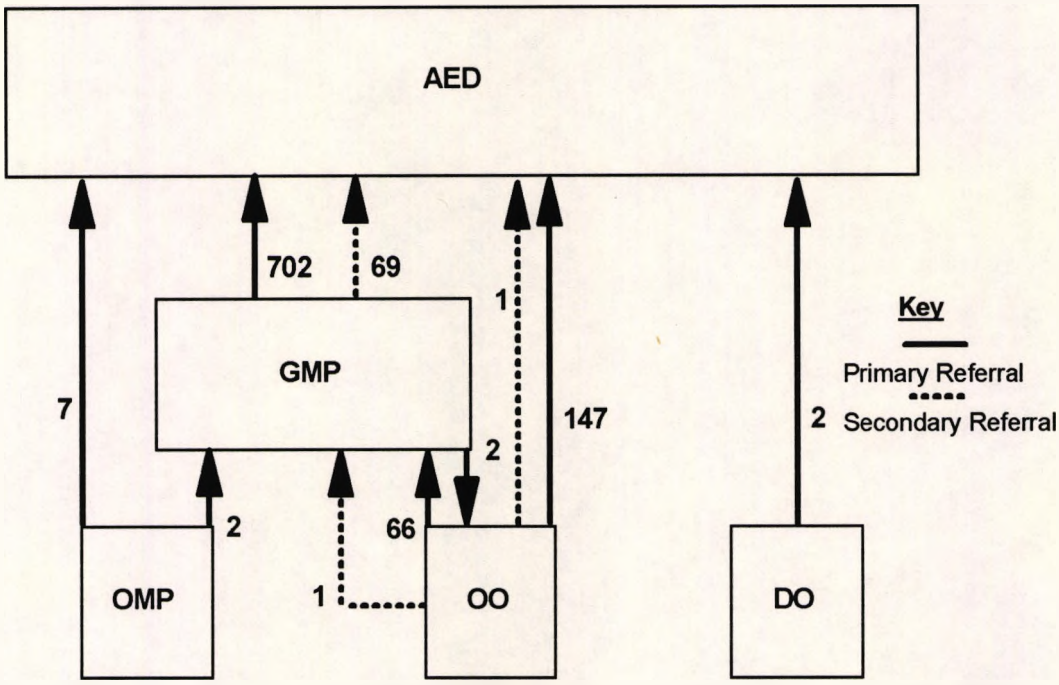


Figure 3.2. Age/Sex graph of patients referred to AED

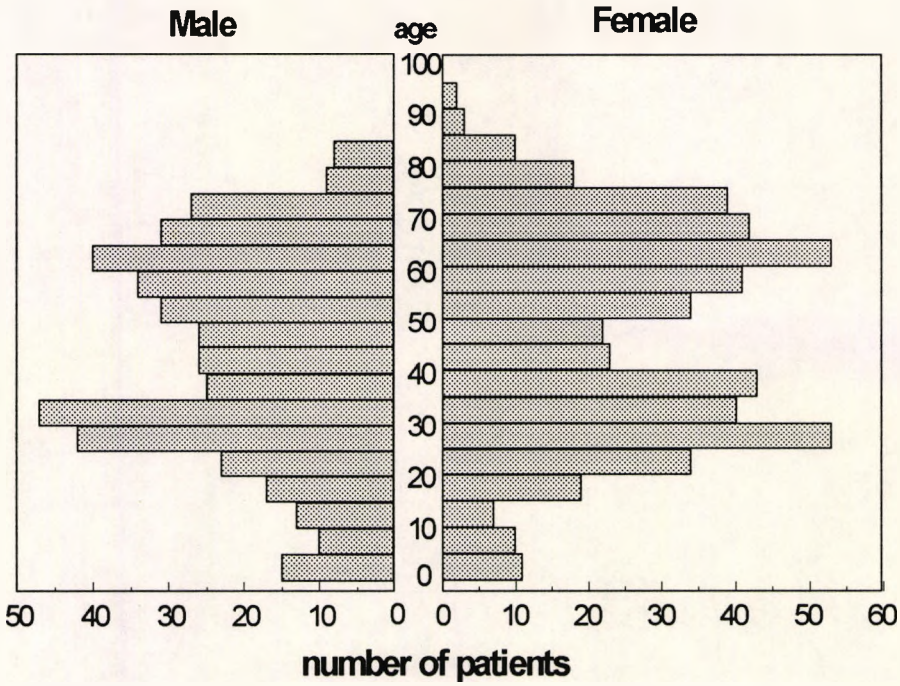
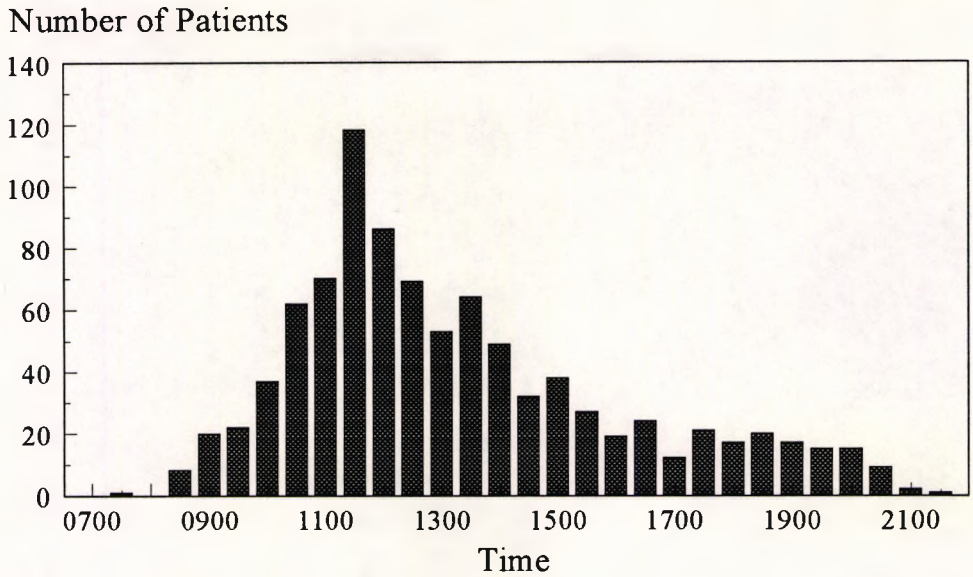


Figure 3.4. Arrival Time



yrs and 65 yrs, respectively). 504 females were seen compared with 424 males (Figure 3.2). This difference was significant (χ^2, df=1, p=0.01). In 10.3% of direct GP referrals neither the patient's age nor date of birth was recorded in the referral correspondence. This information was also omitted in 23.8% of OO referrals and 3 out of the 7 OMP referrals. This data was taken from hospital records to complete the analysis.

The postcode of the referee was also recorded. These were divided by Health Authority (Figure 3.3). It can be seen that although many patients were referred from the North of London, many travelled a considerable distance to attend the AED.

Many patients delayed attending the AED after referral. Those referral letters or forms that were dated show a mean interval between seeing the GP and attending the department of 1.7 days (s=9.13, $s_{\bar{x}}$=0.36). This compared with 3.3 days (s=24.84, $s_{\bar{x}}$=2.11) for direct OO referral. The longest mean delay, of 13.6 days, occurred when OO referrals to the GP were sent to the AED (s=39.29, $s_{\bar{x}}$=5.40). A female patient delayed her attendance by 289 days with contact lens related keratitis. The CO confirmed the diagnosis.

The patient's arrival time in AED was always recorded. The modal arrival time was 1130 and no patients were seen between 2200 and 0700 (Figure 3.4).

Referral letters addressed to other departments or professionals were identified. These included OO and GP referrals addressed to outpatients (16 referrals) and OO referrals addressed to the GP (10 referrals).

86.2% of GPs provided a referral letter while the remainder completed stylised forms. Legibility was assessed for each referral (Table 3.3). As some secondary referees added no additional text, no score was given.

Table 3.3. Legibility of Referral Correspondence

Legibility score	1	2	3
GP Referrals	204 (26.7)	441 (57.7)	119 (15.6)
OMP Referrals	1 (11.1)	7 (77.8)	1 (11.1)
OO Referrals	114 (53.5)	87 (40.8)	12 (5.6)

Score	Criteria
1	If the text was read without difficulty
2	If 1-2 words were difficult to distinguish
3	If 3 or more words were difficult to distinguish

Percentage values are in brackets - Values may not equal 100% due to rounding

GP Direct Referrals

75.6% (702) of the referrals in this study were directly from GPs. 44% stated a diagnosis (Table 3.4). Lid conditions were diagnosed in 8.3% (58) of patients. 18 specified the onset of the condition with a mean duration of 32 days ($s = 34.97$; $s_{\bar{x}} = 8.24$). In 44.4% of lid referrals the GP had already prescribed medication but the condition had failed to respond.

The diagnosis given by the GP was compared with the CO diagnosis. 45.6% of the referral diagnoses were correct and 8.5% were in part correct. The most frequent misdiagnoses were retinal detachments; the CO diagnosed a posterior vitreous detachment in 56% of these referrals. Glaucoma was diagnosed in 22 referrals, but in only 2 was this confirmed. Lid problems were accurately diagnosed. 60 referrals were for eyelid inflammations and 56 of these were correct. Chalazions made up 18 of the 60 referrals in this group.

52.6% referrals suggested no diagnosis but specified the patients' symptoms (Figure 3.5). Frequently more than one symptom was given. Neither symptoms nor diagnoses were given in the remaining cases (3.4%).

70.8% of the patients aged between 25 and 35 years were GP referrals. The majority of these referrals offered no diagnosis (56.0%) but symptoms frequently included pain, red eye and a foreign body sensation. Conjunctivitis (17.0%), corneal opacity/defect (10.0%) and no defect (10%) were the most frequent CO outcomes for this group of patients.

The onset of the condition was frequently stated (Table 3.5). Other information about the patient's previous ocular history, general health, and present medication was

Table 3.4. OO and GP Direct Referrals which state a Diagnosis

Diagnosis Classification	GP	OO(Direct)	OO via GP
Globe disorders*	1		
Retinal detachment*	25	9	5
Retinal Defect*	1(3)	4	4 (2)
Diabetic Retinopathy*	1		
Retinal Vascular Occlusion*	5(1)	6	2
Maculopathy*	1	12	9(1)
Uvea - Iritis*	22(2)	4	
Uvea - Other inflammation*	1(1)	2	
Glaucoma*	19(3)	10	16
Cataract	6	1	1
Keratitis*	22	27	
Corneal Opacity and Defect	21	15	4
Conjunctiva - inflammation	51(9)	2(1)	2
Conjunctiva - Abnormality	8	1	
Eyelids - Inflammation	54(3)		
Eyelids - Abnormality	1		
Lacrimal - Inflammation	2(2)		
Lacrimal - Abnormality	4		
Orbit - Inflammation*	1		
Optic Nerve & Pathway - Inflammation*	5		1
Optic Nerve & Pathway - Abnormality			2
Strabismus and Binocular Vision Anomaly	3		2
Vitreous	8(1)	4(1)	1(1)
Sclera*	6		
Foreign Body*	34	3	
General Trauma*	1		
Pupils			1
Other	6(2)	1	1

First diagnosis shown with second diagnosis in brackets

GP Direct Referrals - 336 diagnoses in 309 referrals that stated diagnosis

OO Direct Referrals - 103 diagnoses in 101 referrals that stated a diagnosis

OO Referrals via GP - 55 diagnoses in 51 referrals that stated diagnosis

* Conditions that could be considered as requiring emergency treatment.

Figure 3.5. GP Referrals - Symptoms with no diagnosis

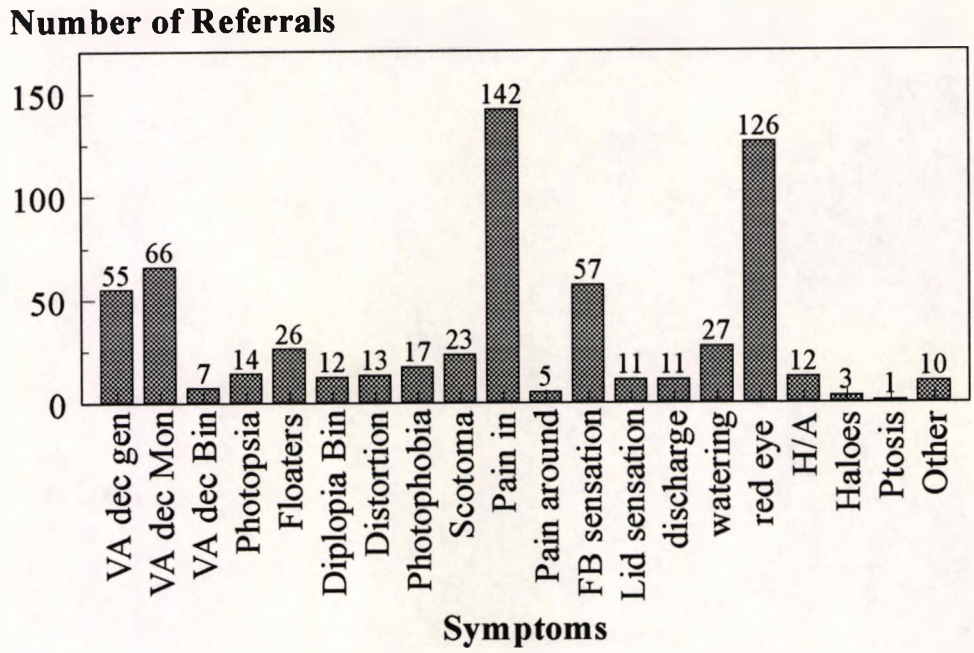


Table 3.5. Onset of Condition/Symptoms

Referral Pathway	N	min	max	$\bar{x}$	s	$s_{\bar{x}}$
GP to MEH	287	0	672	22	58.57	3.46
OO to MEH	53	0	56	10	14.33	1.97
OO to GP to MEH	19	1	112	25	32.03	7.35
All referrals	366	0	672	21	54.18	2.83

n = number of referral letters that indicated the length of time the patient had been suffering from the condition. 1 month = 4 weeks

units = days

Figure 3.6. GP Referrals - Additional Information

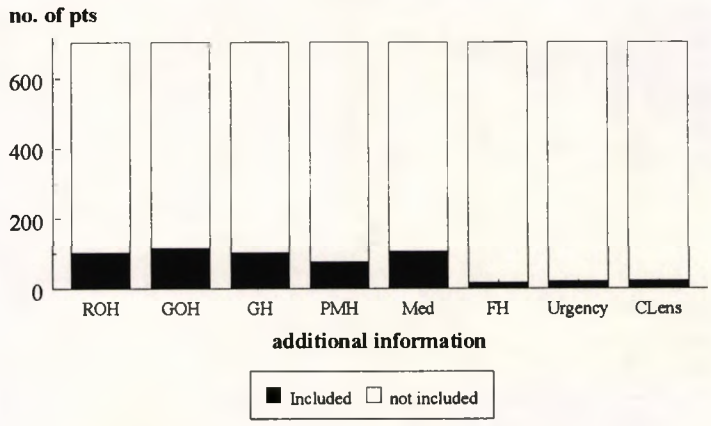


Table 3.6. Tests and Examinations Recorded in Referral Correspondence

Test/Examination	GP	OO
Refraction		68 (46.3)
VA D	51 (7.3)	101 (68.7)
VA N		39 (26.5)
PH	1 (0.1)	5 (3.4)
Disc	13 (1.9)	28 (19.0)
Anterior Chamber	7 (1.0)	4 (2.7)
Lens		13 (8.8)
Lens Description	4 (0.6)	2 (1.4)
Vitreous	3 (0.4)	12 (8.2)
Fundi	56 (8.0)	19 (12.9)
IOP	3 (0.4)	32 (21.8)
IOP (no value)	2 (0.3)	2 (1.4)
Irides	5 (0.7)	2 (1.4)
Conjunctiva	71 (10.0)	14 (9.5)
Vessels	1 (0.1)	6 (4.1)
Macula		15 (10.2)
Background	3 (0.4)	21 (14.3)
Binocular Status	1 (0.1)	3 (2.0)
Motility	6 (0.8)	5 (3.4)
NPC		1 (0.7)
Pupils	56 (8.0)	11 (7.5)
Fields not enclosed	7 (1.0)	6 (4.1)
Amsler enclosed		2 (1.4)
Amsler not enclosed		5 (3.4)
Cornea	64 (9.1)	60 (40.8)
Lid/lash		6 (4.1)
External	206 (29.3)	8 (5.4)
Lacrimal	2 (0.3)	9 (6.1)
Location	67 (9.5)	43 (29.2)
BP	56 (8.0)	
Urine	5 (0.7)	
Other	3 (0.4)	

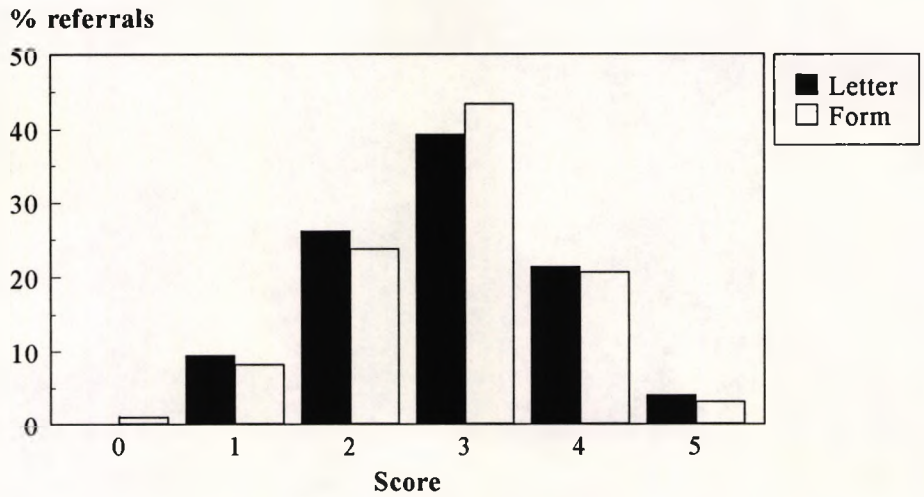
Bracketed Percentage values are the Percentage of all OO or GP Direct Referrals

recorded in very few referrals (Figure 3.6). Various examination techniques and tests were conducted and listed by the GP (Table 3.6). A measure of the VA was given in 51 (7.3%) referral letters and only 1 GP carried out and recorded a pinhole test. In referrals that gave loss of vision as a symptom only 14.9% (28) GPs gave a measurement of the vision/visual acuity (VA). Blood pressure measurements were given in 8% of referrals. 21 referrals had this value as the only examination finding.

Referral correspondence was given a score to quantify the information included. There was no significant difference between the referral letter type and the score ($p>0.20$, t-test, $\alpha=0.05_{1\text{-tail}}$, Figure 3.7). The null hypothesis was accepted.

60.3% of GP referrals were discharged following examination by the CO. The remainder were referred to specialist clinics (33.6%) or reviewed in the AED (6.1%). 2 patients referred to the AED by their GPs left the department before being examined.

Figure 3.7. GP Referrals - Score by Referral Correspondence

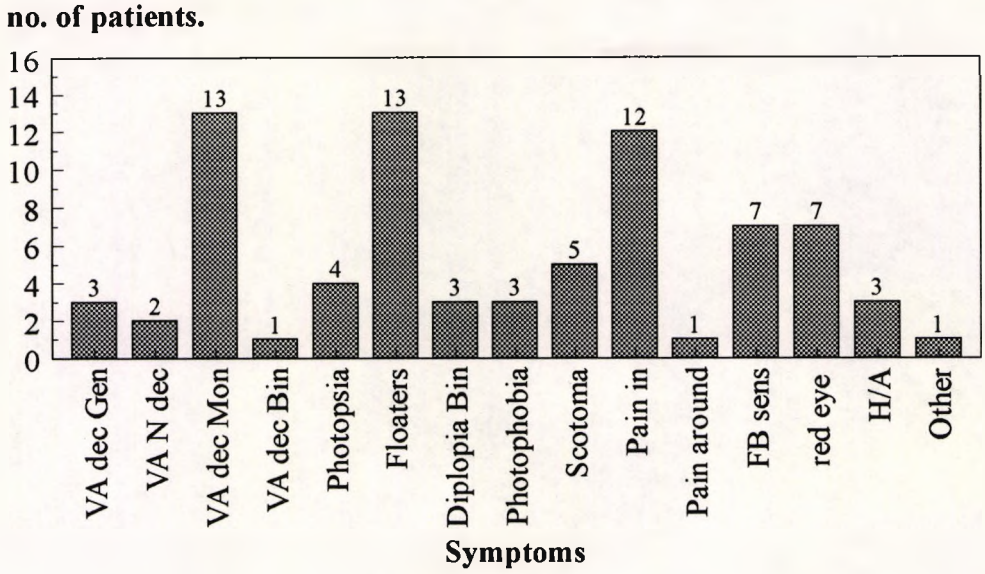


OO Direct Referrals

15.8% (147) referrals were directly from OOs. A diagnosis was given in 68.7% (101) referrals (Table 3.4). These diagnoses were again compared with that given by the CO; 58.6% were correct and 6.7% partially correct. Referral accuracy was high for retinal detachment (7 out of 9 correct) and for maculopathy (9 out of 12). Keratitis was the most frequently referred condition by OOs; 14 out of 27 referrals agreed with the CO.

In 29.9% (44) referrals, only symptoms were specified (Figure 3.8). The most common symptoms listed were monocular visual decrease, floaters, and pain.

Figure 3.8. OO Direct Referrals - Symptoms where no diagnosis was stated



20.4% referrals stated that the patient was a contact lens wearer. 14 of these referrals were diagnosed by the OO as keratitis, 9 as corneal opacity/ disorders and 1 conjunctival inflammation. 10 referrals with no diagnosis gave symptoms of pain, foreign body sensation and redness. Only 1 contact lens wearer (as stated in the referral correspondence) was referred for a non-contact lens related condition.

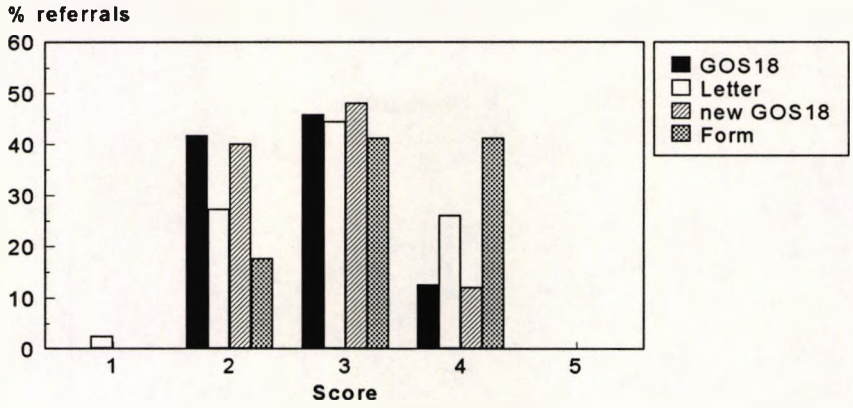
Most OO referrals contained no additional information about the patient's medical history and only 13.6% gave details of the patient's ocular history.

42 OO referrals gave a visual reduction symptom and 36 of these referrals recorded the VA (Table 3.6). 5 OOs stated a pinhole reading. The most frequently recorded result was the VA for distance. IOP measurements were frequently recorded when the referral was not related to intraocular problems.

A referral letter was the most frequent type of correspondence used to refer patients (55.1%), but the GOS18 form was also widely used in both the new (11.6%) and old style (16.3%). Other OOs used self-styled forms.

Content scores (Figure 3.9) were not dependant on the correspondence format ($p=0.24$ t-test, $\alpha=0.05_{1\text{-tail}}$). More OO patients were referred by the CO for further examination and treatment than the GP initiated referrals (χ^2, df=2, $p=0.01$). The null hypothesis stating that there was no significant difference in the disposal of patients was therefore rejected.

Figure 3.9. OO Referrals - Score by Referral Correspondence



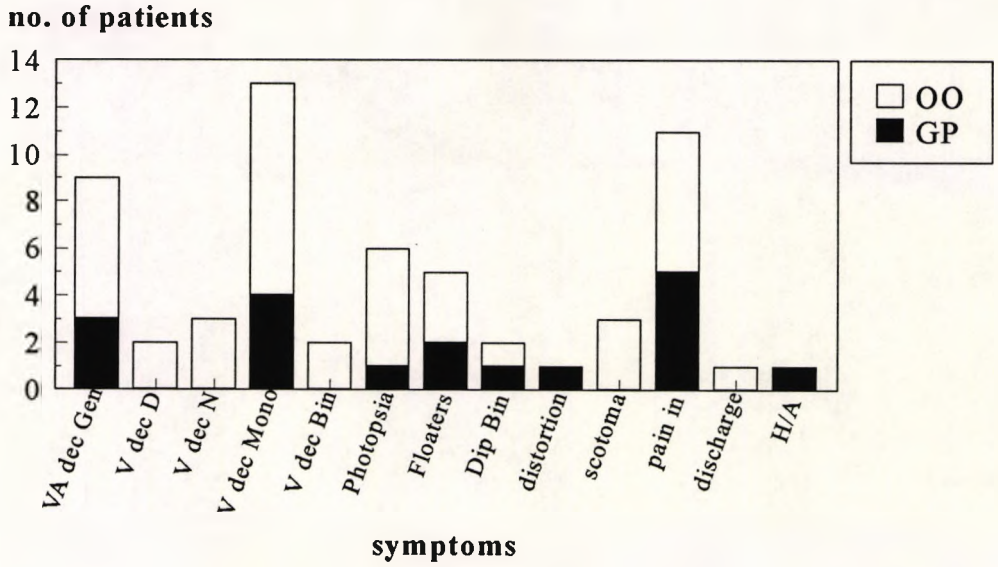
OMP Direct Referrals

Only 7 referrals within the study period were received from OMPs. 4 OMP referrals gave a diagnosis: 1 retinal detachment, 1 iritis, 1 maculopathy and a globe disorder. All were identical to that given by the CO. 5 OMP patients were referred for further treatment within the hospital, 1 was reviewed within the AED, and the final patient was discharged.

OO referrals the GP referred on to the AED

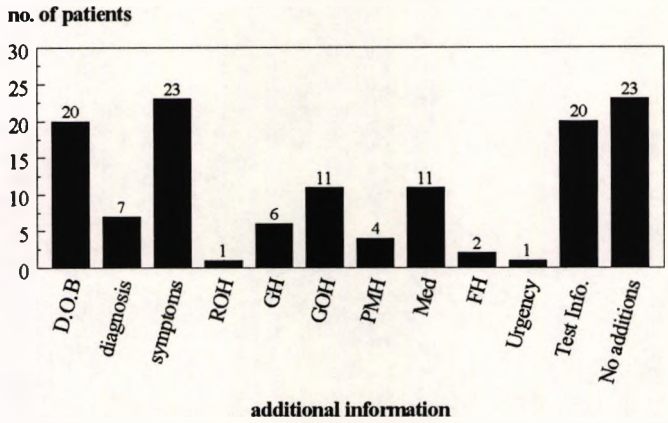
7.1% (66) referred patients attended casualty following referral by a GP and an OO. Both referral letters were received at the AED in 53 of these referrals. 13 OO referral letters were not enclosed but the OO's observations etc. were recorded by the GP. The diagnoses and symptoms listed by the practitioners were recorded (Table 3.4 and Figure 3.10). The GP provided supplementary information to the OO referral in 65.2% referrals (Figure 3.11).

Figure 3.10. OO referrals via GP to AED - Symptoms



9 OO referrals specified that the referral was urgent and 1 stated that the patient should be referred 'soon'. These included referrals for retinal detachment (2), glaucoma (1), maculopathy (2) and nerve/visual pathway disorders (1). 56.1% of the patients were referred on to outpatient services by the CO for further examination and treatment.

Figure 3.11. Additional Information Added by GP to OO Referrals



Other Referral Pathways

2 referrals were directed from the GP to the OO (Figure 3.1). One was then referred to the AED with uveitis, while the other was referred back to the patient's GP before AED referral (maculopathy was diagnosed by the OO and CO). 2 referrals were from DOs for contact lens related disorders; 1 patient was suffering from conjunctivitis and the other was referred for a corneal opacity diagnosed as keratitis. 2 referrals were received from OMPs via the GP. Neither had a diagnosis and both were discharged.

Table 3.7. Comparing GP and OO Referrals - Testing Hypotheses

Variables	p (χ^2)	$H_0(\alpha=0.05)$
Legibility	0.00	reject
Disposal	0.01	reject
Appropriateness	0.00	reject

Comparing the AED referrals of OOs and GPs

Chi square analyses were conducted to identify differences between GP and OO referrals (Table 3.7). From the results it can be seen that this study rejects the following null hypotheses:

- There is no statistically significant difference in the legibility of the AED referral correspondence between the referring professional groups.
- There is no statistically significant difference in the disposal of the AED referrals between the referring professional groups.
- There is no statistically significant difference in the classification of appropriateness of the AED referrals between the referring professional groups.

For these variables the alternative hypothesis ie. there is a statistically significant difference, was accepted. In summary, the study has identified that the OO referrals are more legible. The conditions referred by OOs are more likely to be classified as emergencies and more likely to result in the patient being referred for further treatment than referrals made by GPs. Many GP referrals could not be considered appropriate AED referrals.

Comparing the accuracy of referrals between the two professions is difficult because comparing the same variables would not be possible. GPs referrals are less likely to contain a diagnosis than OO referrals (χ^2, df=1, p=0.00) and are more frequently for lid and conjunctival conditions. For an accurate comparison a larger sample would be required to compare identical conditions, as with the referrals to the OPD (Chapter 2).

3.4. Discussion

Previous studies within ophthalmic AEDs have failed to specify the routes of referral. Except for Jones et al (1986) all studies used the term 'optician'. This suggests a misunderstanding of the terms used in optometry by the authors. Optician is a general layman term used to describe an OO, DO or unqualified supplier of spectacles. It is assumed that in previous studies (Bhopal et al; 1993; Chiapella and Rosenthal, 1985; Harris and Fox, 1986; Kheterpal et al, 1995; Vernon, 1983; Wong and Brazier, 1986;) the term optician includes OO, OMP and DO referrals. In the Southampton AED study (Jones et al, 1986) only OO initiated referrals were recorded. As the hospital receives many OMP referrals (Mackean and Elkington, 1982) it is surprising that no OMP AED referrals were received.

By subdividing the 'optician' category to record the referee, a more detailed picture of ophthalmic referrals was achieved. Very few referrals were initiated by the OMP following the pattern in PCC. DOs referred only 2 patients in this study. Many DOs are qualified to fit contact lenses and could identify contact lens related problems. DOs may refer urgent problems to an OO for examination. The OO would then make the

appropriate AED referral.

The role played by the OO in the care of acute ophthalmic problems is limited (Bhopal et al, 1993). 1.97% of all patients seen in the AED during the study period were referred directly by the OO. A further 0.91% had an optometric input in their referral.

OO referrals via the GP to AED were surprising especially since 34.8% GPs provided no additional information to the referral. Kheterpal et al (1995) identified a similar group of referrals. 13.6% OOs requested urgent referral in their correspondence to the GP. A GP is unlikely to have appropriate expertise to treat the patient in such cases (Featherstone et al, 1992) and onward referral is required (McDonnell, 1988). The College of Optometrists Guidelines (COptom, 1991) on referral specify that in "urgent cases, the patient must be sent to a Hospital Eye Department with a letter of referral". The patient's GP must also be informed. In many of these urgent referrals to the GP, the OO was not following professional guidelines. The GOC accept these guidelines as the peer view of the profession. By referring the patient to the GP, as opposed to the HES, the practitioner may not be seen to be acting in the best interests of the patient. Some OOs must urgently review their referral procedures as they are clearly not acting in the best interests of their patients.

Non-urgent OO referrals to a GP may be forwarded to an AED if the condition was misdiagnosed by the ophthalmic practitioner or the urgency incorrectly assessed. Symptoms may also have worsened since the referral or a completely new condition may have developed. The GPs knowledge of the patient's medical history may also be relevant. Pressure exerted by the patient may also influence the GP's decision (Armstrong et al, 1991). This may be especially true if the patient's perception of the condition differs from that of the GP (Grace and Armstrong, 1987).

The interval between the referral and presentation to the AED was often considerable. The mean values recorded in this study clearly indicates that the patient does not have the same sense of urgency as the referee. Patient arrival times illustrate a similar pattern. The mid morning arrival allows the patient to use the off-peak London transport fares available after 9.30am.

Many patients attending the department had travelled a considerable distance to attend. The distribution may however be misleading because there is a large commuting population in London and this could account for the large distances travelled from the referee.

A stylised format for referrals was recommended by previous studies of AED

correspondence (Montalto, 1991; Morrison and Pennycock, 1991; Thurston et al, 1982; Walsh, 1985). The GOS18 form and standard GP referral form (PRL 1-see Appendix Ic) are widely used for ophthalmic referrals. These stylised referral forms did not contain more referral information than letter formats. The null hypothesis set out in this study was therefore accepted.

Table 3.7. Age Distribution of all AED Patients - Previous Studies

AUTHORS	% MALES	AVERAGE AGE
Hutson-Hay (1977)	60.3	>80% aged 40yrs or less
Edwards (1987)	75	Peak age : 20-29years
Bhopal et al (1993)	67.2	Mean age = 41years
Chiapella and Rosenthall (1985)	71	Median age = 23years*

*** It is probable the authors may have meant the modal value, as from an assessment of the bar chart the median value would be higher.**

The characteristics of the small group of referred patients differs from an AED population as a whole (Table 3.7). A greater number of female than male patients were referred. A Swedish study (Hansagi et al, 1987) found that significantly more women than men ($p>0.01$) seek other medical assistance before attending the emergency department. The difference between the sexes was due to family dependants. In a small study conducted by Walsh (1985) it was found that a greater number of women than men (15:1) delayed attending an AED due to dependants. Women may find it easier to attend their local GP or ophthalmic practitioner than to travel to an AED for an initial consultation.

The number of practitioners offering a diagnosis was low. GPs gave a diagnosis in 44.0% direct referrals. This was similar to other studies of general AEDs. Morrison and Pennycook (1991) found diagnoses in 54.4% compared with 42.5% in a study by Thurston (1982). OOs gave a working diagnosis in 68.7% referrals and with their specialist ocular training it would be expected that the value would be higher than GP's. The COptom guidelines (COptom, 1991) advise inclusion of a possible diagnosis so that as much information relevant to the referral is included.

External eye conditions were most often correctly diagnosed by the GP and present most frequently in general practice (Dart, 1986). They formed most of the GP referrals to the

AED. However, the average duration of these referred conditions (where specified by the referee) was far greater than the 4 days that Wong and Brazier (1986) considered an acute condition. 44.4% patients had also previously been prescribed medication. Clearly these patients were not emergencies.

Patients with lid conditions often suffered from constant irritation and frequently visible swelling and redness, pain and ocular irritation. It appeared that typically the medication that their GP had prescribed had failed to solve the problem. The GP referral ensures that the patient is seen by an ophthalmologist within a few hours who is perhaps able to relieve the symptoms. Vernon (1983) suggests that a more primary care role should be undertaken by ophthalmic AEDs and this may be already happening.

Detailed examination findings, including specific results, were rare in GP referral correspondence. An Australian study by Montalto (1991) found that GPs infrequently recorded results. Pease (1973), who studied referral letters to a general AED, questioned patients referred by their GP. 86 of their referral letters stated physical findings although the patient did not recollect being examined. Kheterpal et al (1995) also identified poor recording of examination and investigation findings in a Birmingham AED study.

This AED study has identified many conditions that must be considered inappropriate referrals by the definition of sight or life threatening conditions outlined earlier. For example long standing conditions are frequently annoying to the patient rather than sight threatening. However, if an extended primary care role for such a department is felt to be "appropriate" then this should be taken into account when considering the classification of referrals. Vernon (1983) comments that if the GP is unable to meet the ophthalmic needs of the patient then the "casualty department would seem to service the acute needs of a population well."

Financial incentives or medico-legal pressures on GPs to refer more patients as emergencies have been put forward to explain high numbers of referred patients to AEDs (Audit Commission, 1996) . Certainly, many referrals received in this study would have been more appropriately referred to PCC. There are not, and probably never really have been, clear distinctions between the AED and outpatient services. Abuse of general AED appointments by patients making self-referrals is well documented (eg. Dale et al, 1990; Davison et al, 1983; Fry, 1960; Hansagi et al, 1987; Horder, 1988; Peppiatt, 1980; Wood and Cliff, 1986). Previous studies have also shown that self referrals are abusing the ophthalmic AED service (Jones et al, 1986; Wong and Brazier, 1986). This study has identified the incorrect use of an ophthalmic emergency service by practitioners, similar

to the findings at BMEH by Kheterpal et al (1995). Kheterpal et al (1995) identified the financial implications of a shift from using AED services to OPD care if referrals were appropriately directed. However, these concerns are inappropriately targeted. The Purchasers of all AED services are the Health Authorities. While the Health Authorities purchase outpatient care for some GPs, those who hold their own funds (GPFHs) contract providers to provide services themselves. It is therefore the referrals made to AED from GPFH that require scrutiny, and it is unfortunate that this data was unavailable from the MEH study. Following the large number of inappropriate referrals received at the MEH AED and in Birmingham (Kheterpal et al, 1995), further research is required to investigate the referral patterns of fundholding general practitioners.

In this study the abuse of the AED by both patients and practitioners is clear. Many referrals made to MEH AED are an inappropriate use of this emergency department. The NHS Executive however continues to sideline this issue and Health Authorities are formulating their own local solutions to the problem eg. GPs in AEDs. At MEH the division between AED and OPD clinics not always well defined. If appointments are available, the PCC policy is to take inappropriate referrals that arrive at the AED, on a walk-in basis. It could be envisaged that continuing to merge the services in this way would produce a more efficient and more equitable service for all patients. Careful consideration would need to be given to patient arrival times and presenting ocular conditions so that manpower could be most effectively targeted. The obvious difference between the services remains the 24-hour availability of the AED, an essential part of true emergency service provision. The funding implications for HAs and GPFHs require review which it is not believed is presently being widely undertaken. Clearly a more flexible approach to clinic timetables would be very appealing to purchasers and patients alike.

4.ACCESS TO SECONDARY CARE - THE PATIENTS' EXPERIENCE

4.1. Introduction

Feedback surveys from patients have been a useful tool in developing and structuring health services (Dixon and Carr-Hill, 1989). It was felt important that patients should be given the opportunity to express their experiences of the ophthalmic referral process. Several factors may influence a patient's perception of the referral process.

- The ease of access to the hospital was explored because convenience of care is important in the patients' satisfaction (Hulka et al, 1975). Long journey times are often a problem. Patients arrive tired and they are unlikely to feel happy with their care. Expensive journey times are also negative factors.
- It has been shown to relate to a number of aspects of how the clinician interacts with his/her patient (Cleary and McNeil, 1988; Deyo and Diehl, 1986; Fitzpatrick and Hopkins, 1993). Therefore if a patient has had a bad experience with a referee then their perception of the referral process will not be positive.
- The patient's health status is also important (Hall et al, 1990). This American study showed that patients are generally happier with their care if they had a better physical or psychosocial health status.
- External factors play a part in some patients perception of the care they receive. Previous personal experience of a health care provider or experiences of family and friends may be a positive or negative factor, media coverage and recent experience of using other health services also play a part (Judge and Solomon, 1993).

Although many of these factors were not felt appropriate to investigate in this study, the ease of access to the clinics was studied; questions about the cost of travel and the journey time were asked. This factor is frequently treated by the NHS as if it has no value. Its importance has previously been studied in a MEH study (Woodward and Drummond, 1984).

Location

The study was undertaken in two parts. Interviews were initially conducted within the PCC at MEH and then at the clinic based within St. Andrew Hospital, Bow (CEB). The Bow clinic was established as a community-based service for patients referred to MEH.

The aim was to provide a convenient, local clinic for patients living on the east side of London. Service provision was designed to be identical to the PCC within the main hospital and many staff see patients at both clinics. Patients referred from CEB to the main hospital site were questioned again to reassess their opinions of the Bow service.

4.2. Aims and Hypotheses

The study aimed to assess how patients were referred to the HES and the ease of access to the hospital. Patient perceptions of a community-based service were also explored and factors that influence the patient/hospital interface assessed. The following hypotheses, stated in the null form were also explored:

- There is no difference in the travelling time for patients attending the main hospital and those who attend the community clinic.
- There is no difference in the travelling costs for patients attending the main hospital and those who attend the community clinic (public transport costs).

4.3. Pilot Study

This pilot study aimed to identify the best method of obtaining information from patients regarding their referral experiences.

Methods

Three different methods of collecting patient responses were used. These were conducted at the following clinics:

1. 06/04/93 pm - Patient Interviews
2. 07/04/93 am - self completion questionnaires
3. 08/04/93 am - Computer aided patient interviews

Every effort was made to ensure that there was no interference with the smooth running of the clinic.

1. Questionnaire

A questionnaire was devised for self completion by all patients attending the clinic (Appendix VIII). It was devised using closed style questioning to aid memory recall and to reduce the length of completion time of the questionnaire. A short comment section

was also added to record a larger breath of patient views, but the whole document was kept to three sides of A4 paper.

A clear explanation of the aims of the questionnaire were set out at the start of the document, with reassurance to the patient that all information provided in their answers would be dealt with in strictest confidence. Patients were handed the questionnaires just after booking in with the clinic clerk and it was made clear to them that they had no obligation to complete the form. Clip boards and pens were also issued. Additional help was given to patients who requested it.

2. Paper and Pencil Interviews (PAPI)

Patients were interviewed just after booking in with the clinic clerk, while they were waiting for their initial examination by the ophthalmic nursing staff. Before each interview the patient was asked if they had any objections to answering the questions, and all interviews were conducted, by the author, with the patients seated. The responses were recorded on a summary sheet. All patients were thanked for their help at the end of the interview.

3. Computer aided personal interviews (CAPI)

These were conducted in an identical method to the PAPIs except that a lap top PC was used to collected patient response. All information provided by the patient was typed directly into the PC onto a database file. All patients were thanked for their help at the end of the interview.

Results

All responses from the various techniques reported above were put into a database to allow analysis and comparison to be undertaken.

1.Questionnaire

This was presented in a clinic with 62 patients booked to attend. Patients were booked in at 15 minutes intervals with up to five patients being booked in at one appointment time. 4 patients did not attend the clinic and 4 patients were allocated from the casualty department to fill the bookings. 58 patients were given a questionnaire and 4 patients were missed. Nobody refused to complete the questionnaire, but several patients failed to complete all the questions. It took most patients less than 5 minutes to fill in the survey

and most reported no problems with the completion. Three patients admitted having difficulties due to language and in these cases help was given in completing the questionnaire. Several patients filled in the front sheet only, having failed to turn over the page and this was pointed out to them.

The question concerning consultations with various practitioners was correctly completed in most cases, although difficulties appeared to be met when numbering which practitioner was seen initially (to be numbered 1) and secondly (to be numbered 2). 13 patients' answers show discrepancies between the first two questions and of the rest, 5 did not number the reply boxes as requested.

2. PAPI

24 patients were interviewed out of 29 patients booked to attend. 3 patients failed to attend, 1 patient cancelled their appointment and 1 interview was abandoned as the patient, who spoke little English, was unable to understand the questions.

3. CAPI

No patient refused to answer the questions. 22 interviews were conducted including 2 additional walk-in patients from the casualty department. 2 patients who attended the clinic were not interviewed.

Most interviews took only 2-3 minutes to complete.

Discussion and Conclusions

Patients responded well to all methods of data collection. In all cases, there was no difficulty with the length of the questionnaire or interview, or patient's willingness to take part in the survey.

The questionnaire was presented to the largest number of patients in a busy clinic. It was answered well in most cases. Where particular questions remained unanswered, there did not appear to be any reason. It may have been the result of misunderstanding or misreading. Unfortunately, frequently checking the questionnaire was not possible after it had been completed. This would have picked up unanswered questions and discrepancies.

A selection of open and closed question styles were used. Open questions do not presuppose the range of responses an individual may give, whereas a closed question style gives patients set options (St.Leger et al, 1992). Closed questions can act as prompts to

help the patient remember the correct response, but can also suggest a response to the patient if they have forgotten or do not wish to reveal the real response.

In setting out questions 1 and 2, much thought was given to the wording and structure. It was felt important that the referral initiator should be correctly identified. Patients may have felt that both questions were asking the same. The use of the word 'referred' in question 2 should have been explained. The large number of discrepancies between question 1 and 2 (22.4 %) must indicate that the wording was not as clear as required. The question concerning the cost of travel was also incorrectly worded on the questionnaire. It is not clear whether the single or return fare was required. This difficulty was picked up quickly when conducting the interviews and the wording of the question to each patient was more specific.

Obviously, with the direct interview technique used in the PAPI and CAPI methods, any discrepancies were immediately questioned. This allowed more confidence to be attached to the replies. Further, if a question was not initially understood by the patient, limited explanation was given. Care was taken not to influence the patient's response. However, all the interviews took less time than the completion of the questionnaire. Dixon and Carr-Hill (1989) felt that interviewing increases the quantity and quality of the data collected, compared with questionnaires. The problems often associated with interviewer variability were overcome by using only the one interviewer.

Interviews have the disadvantage that, especially in the waiting room setting, the responses can be overheard by other patients. Patients may therefore be more reluctant to give personal details (McIver, 1991) and may be reluctant to complain about the services they have received. Conducting the interviews elsewhere was however not felt to be an option as there was no quiet location close to the clinic. Moving patients to a different location could cause disruption to the clinic schedules.

There was no difference in the patient response to the PAPI and CAPI techniques. The lap-top computer did however appear to increase the patient's interest in the exercise.

Following the data collection, the questionnaire results and PAPI results were all transferred to the computer data base for analysis. The advantage of the CAPI technique was obvious, with no data transfer required. The results were encouraging and the CAPI technique would be the most efficient method of data collection for a larger study.

4.4. Patients referred to The Primary Care Clinic, City Road

Method

Interviews were conducted during the week beginning 17th May 1993 with patients attending the PCC at MEH. All patients were interviewed, by the same interviewer, in the waiting area after booking in with the clinic clerk. Before each interview the patient was asked if they had any objections to answering the questions.

Patients confirmed their name, and their hospital number was recorded from the clinic sheet. Question 1 identified the referral initiator; no distinction was made between an OO and OMP. Travel costs to the clinic were specified as the single fare or half a return fare for public transport and taxi/mini cab users only. The patient's socioeconomic classification was also recorded (OPCS, 1993).

A Computer Aided Personal Interview (CAPI) technique using a lap top PC was used (Appendix IX). All patients were thanked for their help at the end of the interview.

Results

During the week beginning 17/05/93, 387 patients attended the PCC (Table 4.1). 23 walk-in patients were excluded from the study. 13 patients were not interviewed, 1

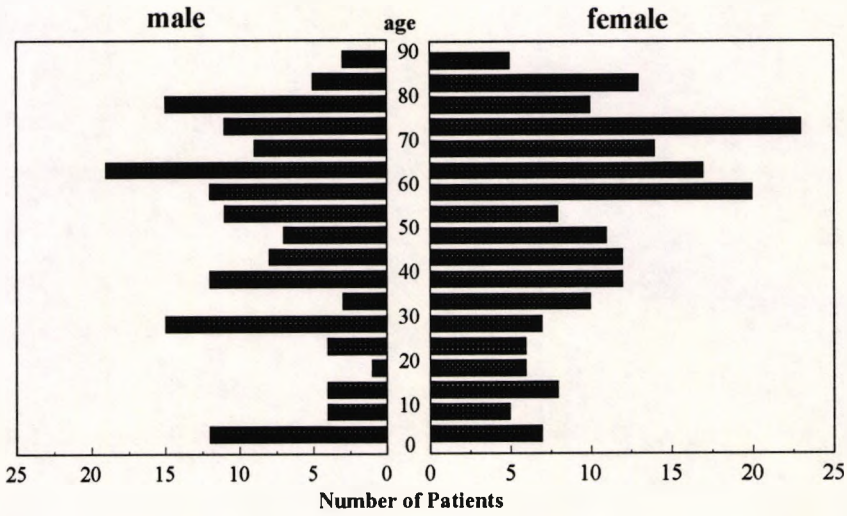
Table 4.1. Primary Care Clinic Attendances 17-21/05/93

	Attended	Walk-ins	Questioned	Missed	Other
Monday am	24	1	23	0	
pm	44	1	39	4	
Tuesday am	26	3	23	0	
pm	24	0	22	2	
Wednesday am	48	4	42	2	1 abandoned
pm	41	2	37	2	
Thursday am	51	5	45	0	
pm	37	2	34	1	
Friday am	60	5	54	1	
pm	32	0	30	1	1 refused
Totals	387	23	349	13	2

patient refused and another interview was terminated due to the patient's disabilities. 349 patients were included in the study. Interviews took no more than 4 minutes and patients appeared to welcome the opportunity to contribute towards the study.

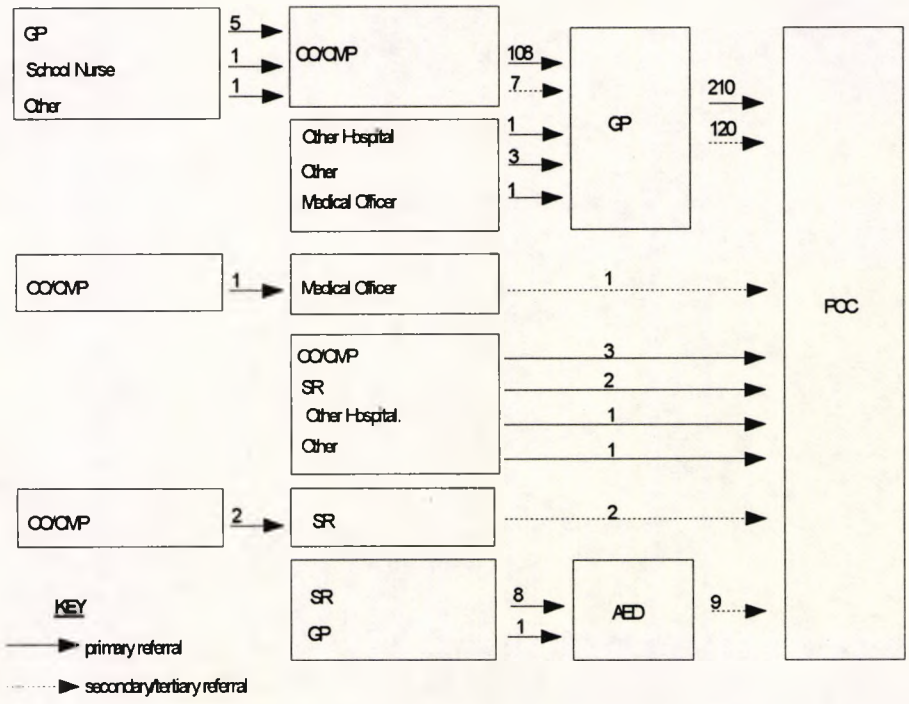
The patient's age and gender were recorded (Figure 4.1). The mean age of female patients was 51.74 years (s=23.18, $s_{\bar{x}}$=1.32, Mdn=57.5 yrs) and 49.19 years (s=23.92, $s_{\bar{x}}$=1.30, Mdn=54 yrs) for males. Despite this difference, the male and female age distributions were not significantly different (p=0.32, t-test, $\alpha=0.05_{2\text{-tail}}$). 216 (61.9%)

Figure 4.1. Age/Sex Distribution



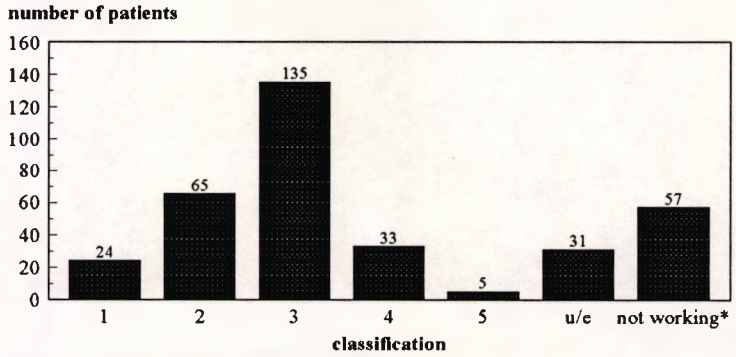
n = 155 males and n = 194 females

Figure 4.2. Referral Pathways



referrals were initiated by the GP and 114 (32.7%) by an OO or OMP. Other referral initiators included: a medical officer, other hospitals, a school nurse and self referrals, either via the AED or directly to PCC. The GP was involved in 336 (96.3%) referrals (Figure 4.2). 75 patients stated that they had specifically requested an appointment at MEH (Figure 4.3). This group's socioeconomic classification distribution (groups 4 and

Figure 4.3. Socioeconomic Classification



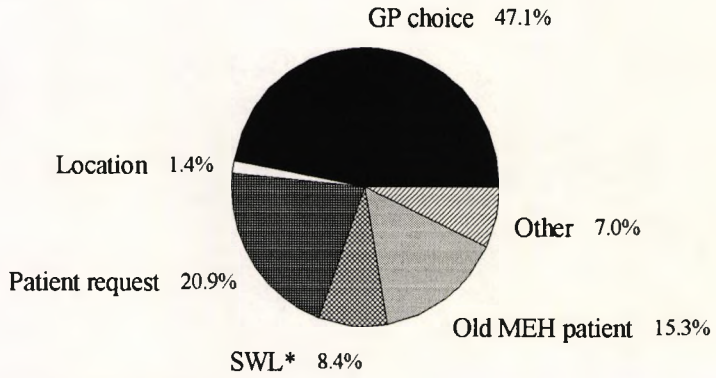
* group includes patients who are retired but not classified due to death of spouse.

5 were combined, and patients who were not employed were classified together) did not differ significantly from the rest of the patient population (χ^2, df=4, p=0.63). The GP made the decision to refer the majority of patients to MEH, but other factors eg. home and work locations were taken into account (Figure 4.4).

45.3% of patients used London Underground, the most frequent form of transport, to cover at least part of their journey to MEH (Figure 4.5). 77 patients took 2 different forms of transport to the hospital and 9 took 3. Despite comprehensive public transport travelling times were long (Figure 4.6); 54.16 minutes was the mean journey time (s=30.64, $s_{\bar{x}}$=1.64).

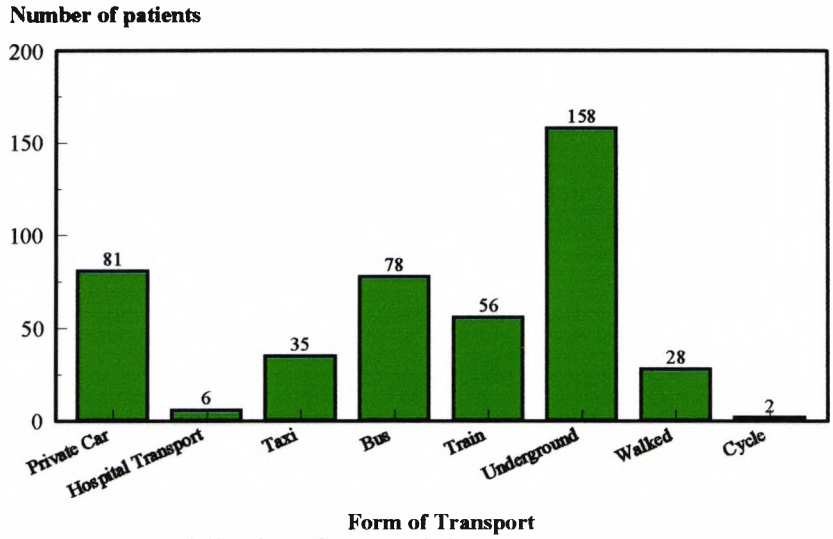
74.65% (268) of patients used public transport or a taxi during part or all their journeys to MEH (Figure 4.5). 80 patients had no financial outlay because they had

Figure 4.4. Reason for Referral to MEH (PCC)



*SWL = shorter waiting lists
10 patients gave 2 reasons

Figure 4.5. Transport to PCC



Note: 77 patients travelled by 2 forms of transport and 9 by 3

Figure 4.6. Travelling Times to PCC

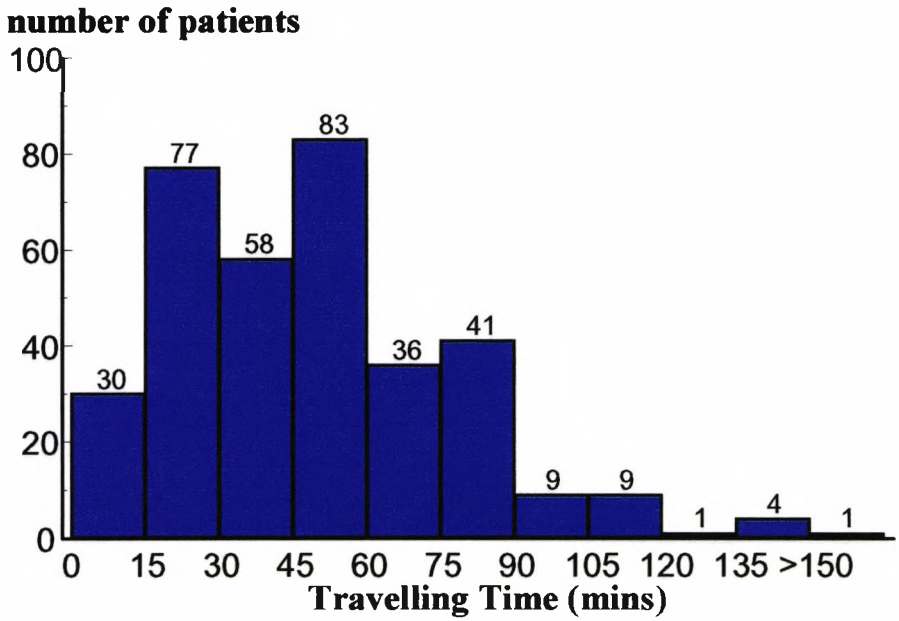
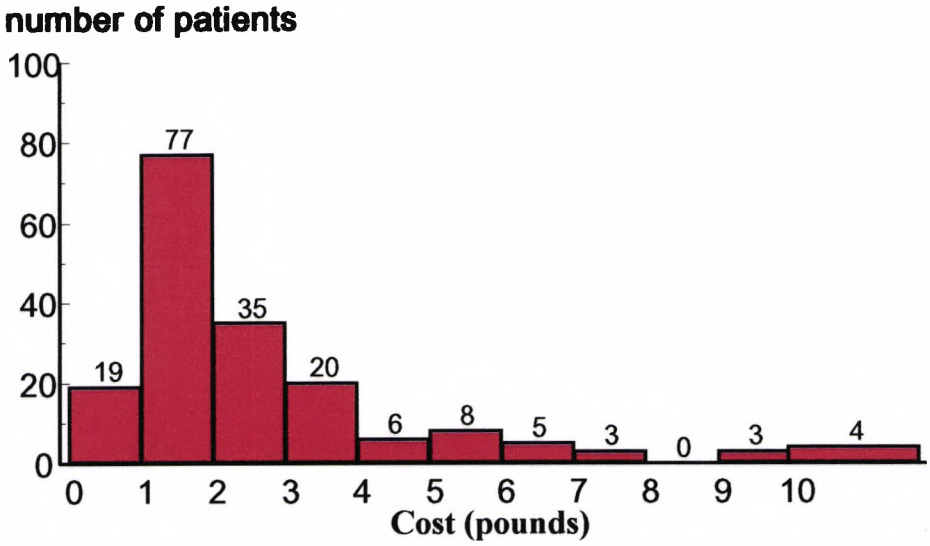
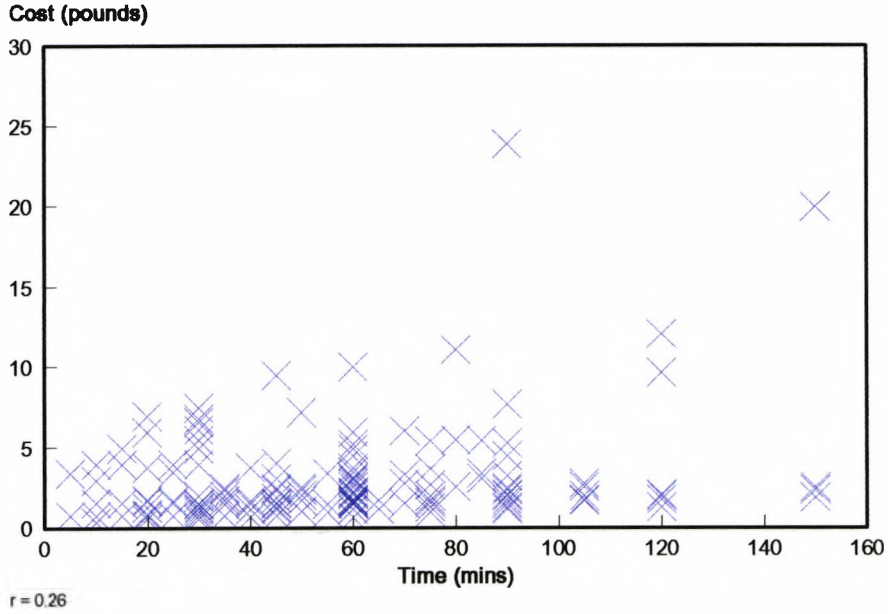


Figure 4.7. Travel Cost to PCC



171 patients travelled by car or paid out no money for travelling

Figure 4.8. Relationship between journey cost and time (PCC)

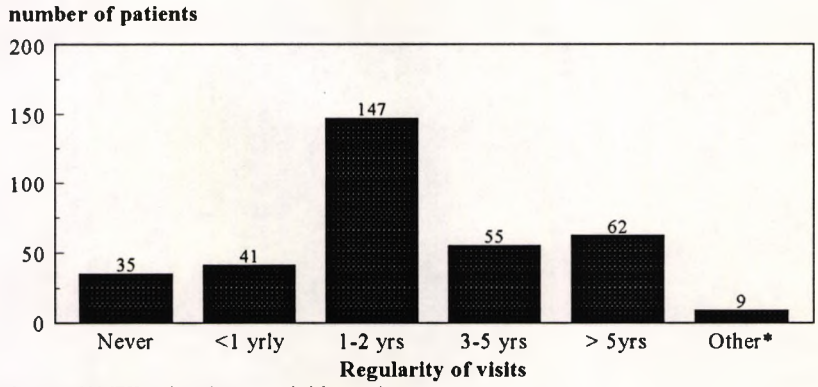


travel passes/season tickets and 2 patients had passes that covered part of their journey. Patients spent an average of £2.88 (s=2.88, $s_{\bar{x}}$=0.22, Figure 4.7). 28 OAPs were unable to use travel passes because their appointments meant travel was required before 9.30am. 6 patients travelled to their appointment by hospital transport. There was no correlation between the cost of travel and the length of time travelling (Figure 4.8).

The majority of patients claimed to attend for an eye examination regularly (Figure 4.9). It was during a routine eye examination that 34 patients were referred. 77 OO/OMP referral patients were aware of a problem before attending for the examination.

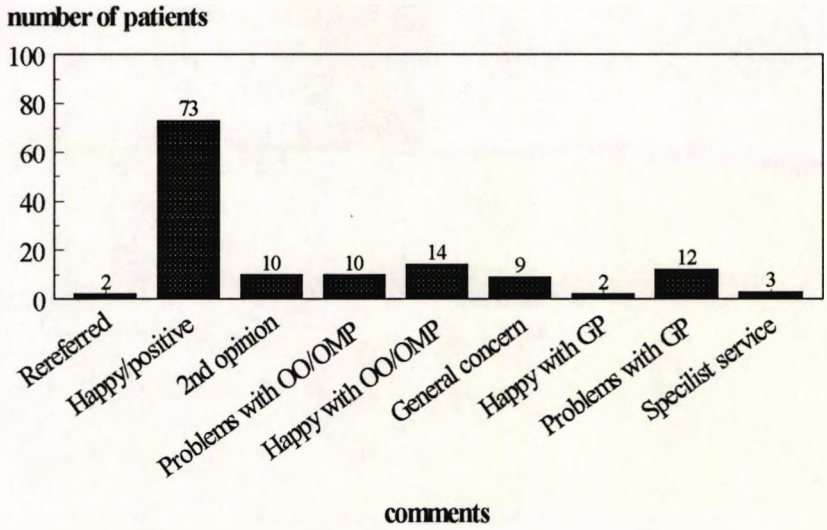
Patients were generally satisfied with the eye care they had received before they were referred (Figure 4.10), although a few patients had experienced difficulties.

Figure 4.9. How often do you visit your optician for an eye examination?



* some old MEH patients have attended for regular eye examinations within the hospital

Figure 4.10. Do you have any comments on the eye care that received before you were referred to MEH?



4.5. Patients referred to a Community Eye Clinic

Method

The interviews were conducted in an identical manner to the PCC interviews. Adjustments were made to the interviews to explore in greater depth the issues of delays and convenience of a community clinic (Appendix X).

Patients who were referred on from CEB to MEH for further tests and treatment were sent postal questionnaires (Appendix XIa) six months after their initial CEB interviews. The questionnaires were numbered and posted with stamped addressed envelopes. A covering letter explained the reason for the questionnaires (Appendix XIb). Reminders were sent after 2 and 4 weeks. The second reminder contained an additional questionnaire and a stamped addressed envelope.

Results

220 patients were booked to attend the CEB during the week beginning 13 September, 1993. 44 patients cancelled late or failed to attend, 8 patients were not interviewed and 1 patient refused. 167 were therefore included in the study (Table 4.2). 64 men and 103 female patients were interviewed (Figure 4.11). The mean age of female patients was 54.0 yrs compared with 45.8 yrs for males. The male sample population were significantly younger ($p=0.02$, t-test $\alpha=0.05_{1\text{-tail}}$).

Table 4.2. Bow Community Clinic Attendances

	Attended	Questioned	DNA/late cancel	Missed	Refused
Monday am	41	26	15	0	
pm	42	33	7	2	
Wednesday am	37	31	6	0	
pm	25	19	6	0	
Friday am	45	32	6	6	1
pm	30	26	4	0	
Totals	220	167	44	8	

Figure 4.11. Age/Sex Distribution

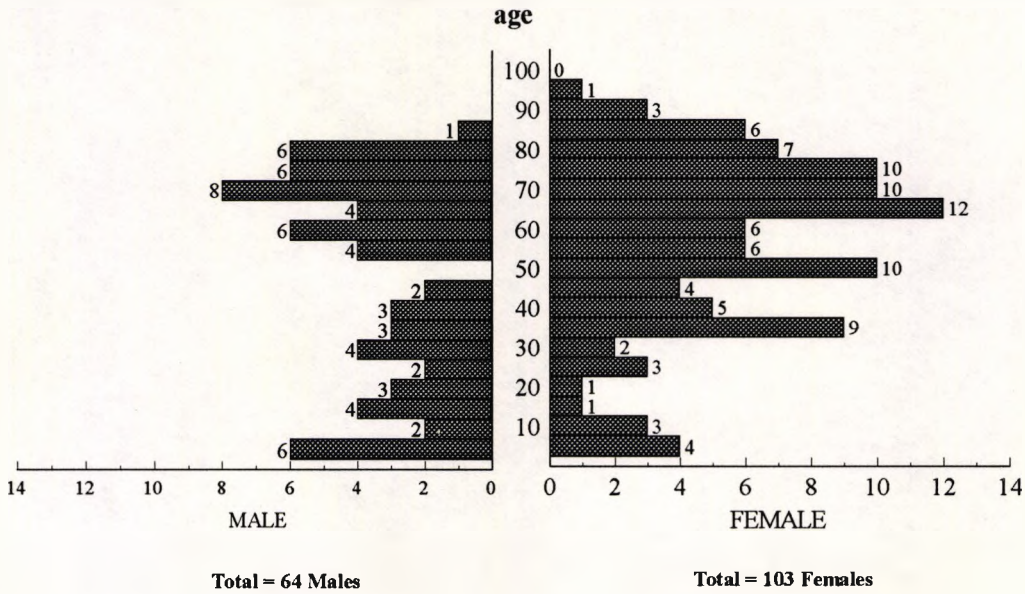
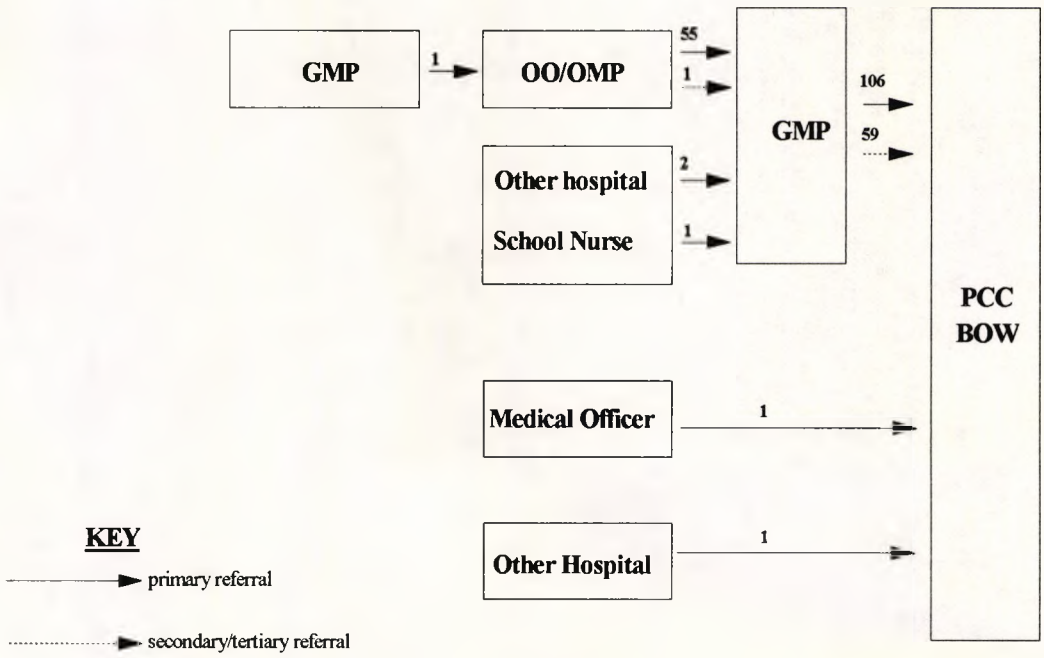
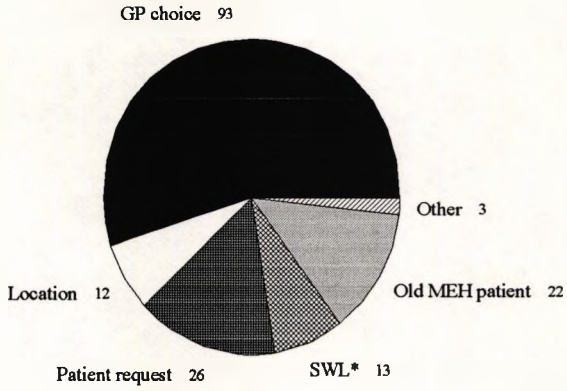


Figure 4.12. Referral Pathways



107 (64.1%) referrals were initiated by the patient's GP, 55 (32.9%) by an OO or OMP, 3 from another hospital, and 1 each from a medical officer and school nurse (Figure 4.12). 26 patients had specifically requested to attend MEH and 22 patients stated that they were referred because they were previous MEH patients (Figure 4.13).

Figure 4.13. Reason for Referral to MEH (CEB)



***SWL = shorter waiting list**

2 patients gave 2 reasons (both patients had requested MEH and gave reasons)

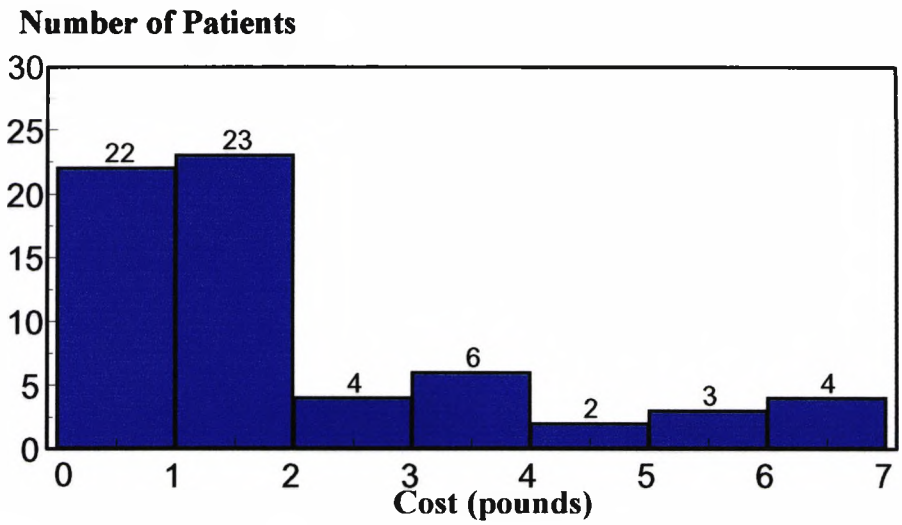
The reason for a delay of greater than 2 weeks between OO referral and GP was recorded. 1 patient claimed to have been advised by his OO to delay for 3 weeks, 1 patient was on holiday, another had forgotten and 3 had not got around to arranging an appointment any earlier. A 4-week delay resulted because a housebound lady had been waiting for her GP to call.

The GP was involved in the referrals of all but 2 patients. 39% of patients referred from or via their GP could not recall the GP "looking into their eyes".

The mean travel cost for patients travelling by public transport or taxi was £2.10 (s=1.8, $s_{\bar{x}}$=0.22) with a median cost of £1.40 (Figure 4.14). The most frequent form of transport was the Underground (including Docklands Light Railway); 68 patients travelled at least part of their journey on this service (Figure 4.15). 3 OAPs with travel passes were unable to use this card because their appointments were too early in the morning. The time spent travelling ranged from 5 minutes to 3.5 hours ($\bar{x}$=34.6 mins, s=27.3, $s_{\bar{x}}$=2.11, Mdn=30mins, Figure 4.16). There was no statistical relationship between the journey time and the cost (Figure 4.17).

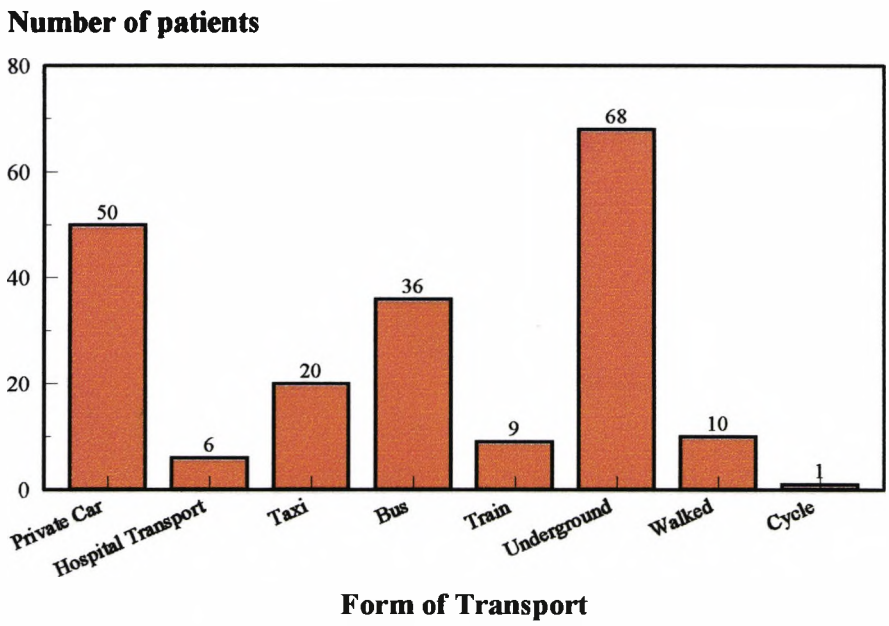
Patients were asked to comment on being seen at the CEB rather than at the main hospital. 60% of patients who replied stated that the locality was better, but 13% said it

Figure 4.14. Travel Cost to CEB



103 patients travelled by car or had no travel costs

Figure 4.15. Transport to CEB



Note: 31 patients travelled by 1 forms of transport and 9 by 3

Figure 4.16. Time Travelling to CEB

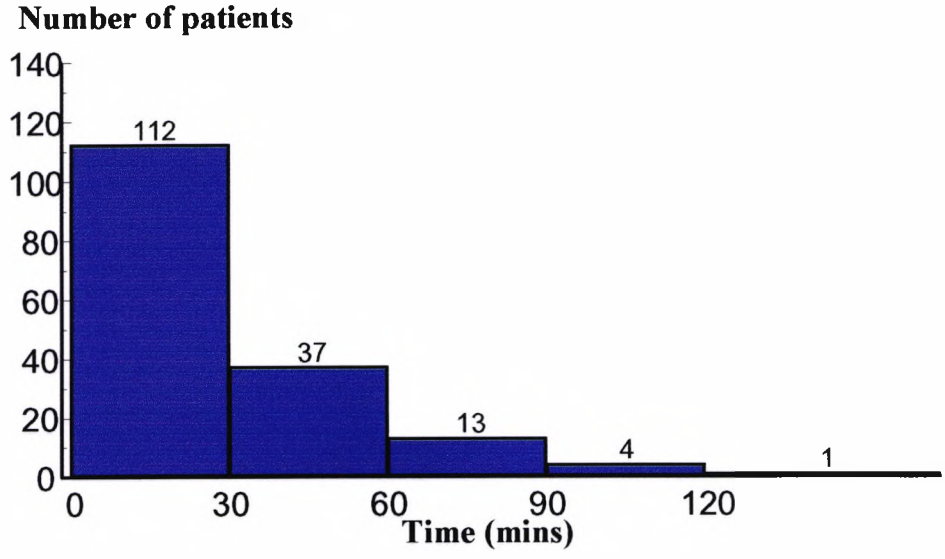


Figure 4.17. Relationship between journey cost and time (CEB)

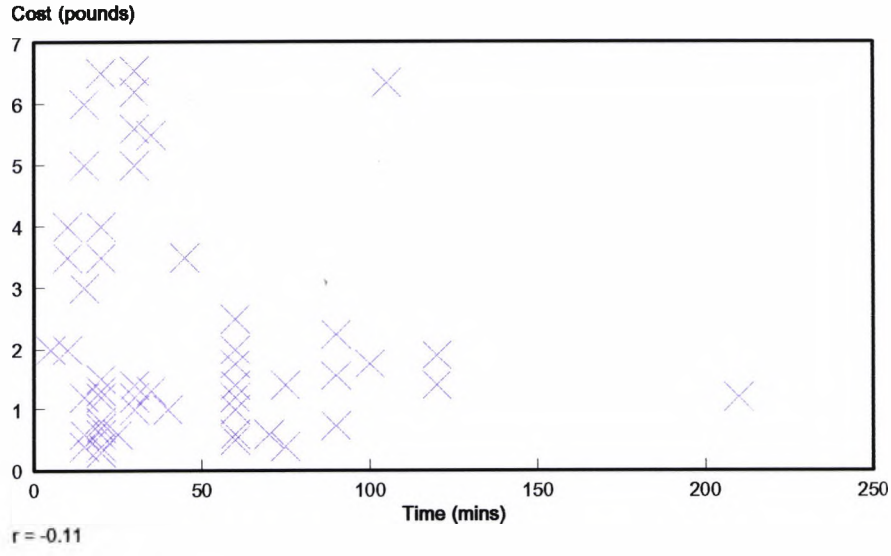


Figure 4.18. Do you have any comments on the fact that your appointment was at this clinic and not the main hospital?

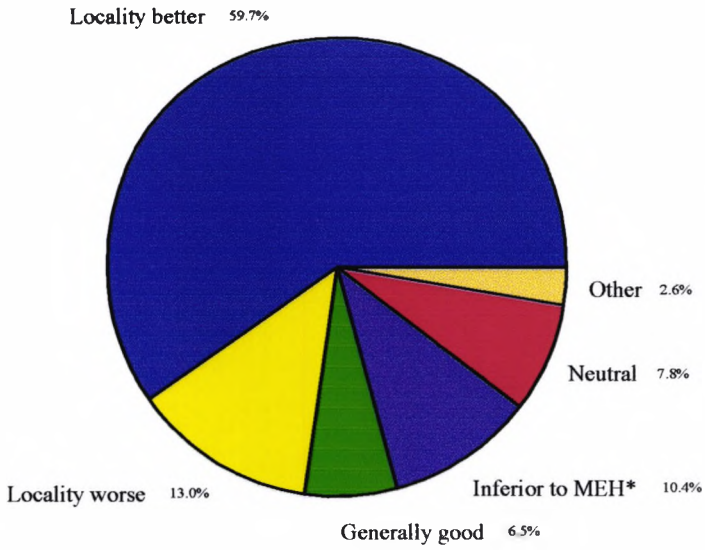
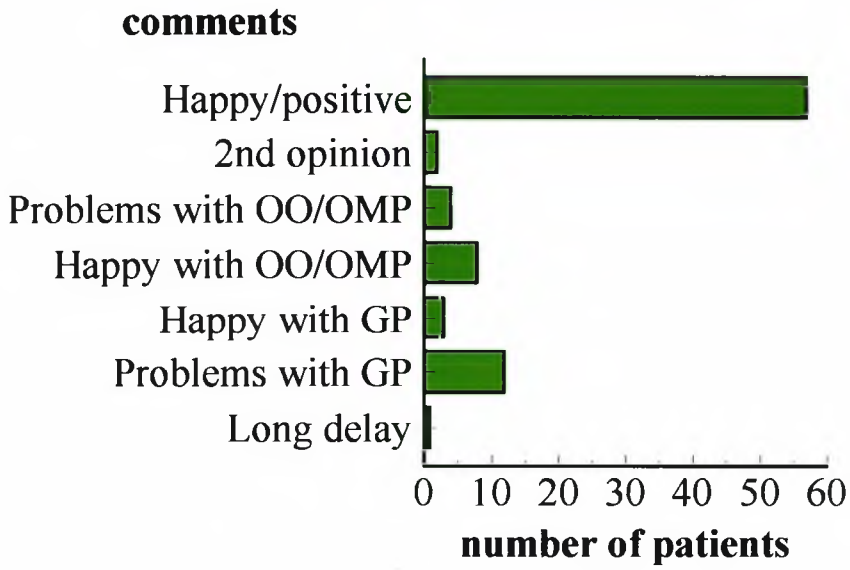


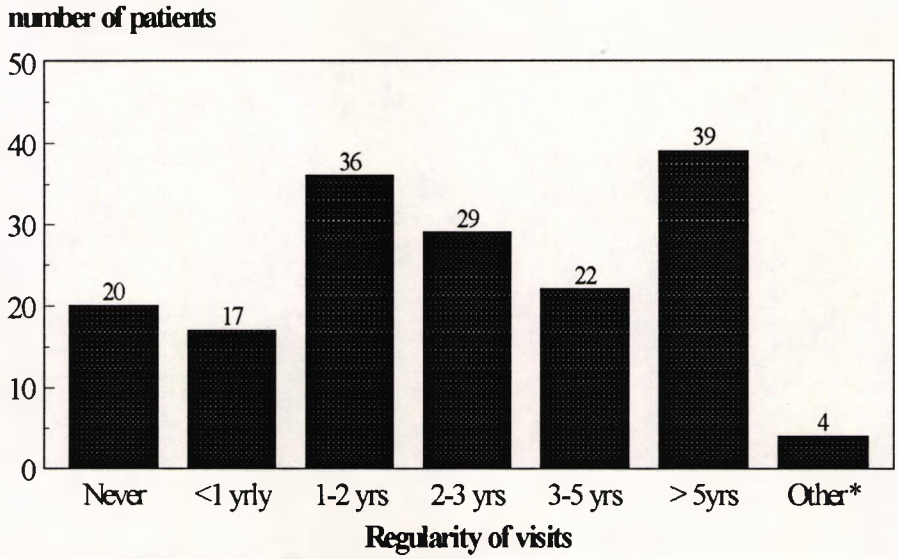
Figure 4.19. Do you have any comments on the eye care that you received before you were referred to MEH?



was worse (Figure 4.18). Patients were generally content with the eye care that they received prior to referral (Figure 4.19).

The majority of patients claimed to attend their OO or OMP regularly for eye examinations (Figure 4.20). Just under half the patients visit more regularly than every three years. 55 patients were referred initially by an ophthalmic practitioner. 48 patients had been aware of problems with their eyes before they attended for the appointment and only 5 patients attended for a routine checkup (2 patients gave other reasons).

Figure 4.20. How often do you visit your optician for an eye examination?



* some old MEH patients have attended for regular eye examinations within the hospital

4.6. Patients referred from CEB to the main hospital

81 CEB patients interviewed were referred on to the main hospital for further examinations and treatment. 51 questionnaires were finally received but 3 were discarded because they were incorrectly completed. This gave a response rate of 59.3%. All responses are illustrated in Figures 4.21(1-11) and Table 4.3.

4.7. Comparison of the two clinics

There was no statistical difference between the proportion of referral initiator's (GP, OO/OMP, Others) patients attending each clinic (χ^2, df=2, p=0.91). However, there was a difference in the time spent travelling to the clinic and the cost of travel (Table 4.4).

Table 4.4 Comparing the community and main hospital clinics

Variable	Clinic	$\bar{x}$	s	$s_{\bar{x}}$	Mdn	p*
TIME (mins)	PCC	54	30.69	1.64	50	$p=3.8x10^{12}$
	CEB	34	27.29	2.11	30	
COST (pounds)	PCC	2.88	2.88	0.22	1.96	p=0.02
	CEB	2.10	1.80	0.22	1.40	

* **t-test $\alpha=0.05_{1\text{-tail}}$**

The null hypotheses were therefore rejected and the following alternative hypotheses were therefore accepted:

- There is a difference in the travelling time for patients attending the main hospital and those who attend the community clinic.
- There is a difference in the travelling costs for patients attending the main hospital and those who attend the community clinic (public transport costs).

In summary, travelling costs to the community clinic were less for those patients who travelled by public transport without a travel pass. Travelling times were shorter for all patients.

4.8. Discussion

The response rate was extremely good. There is always a fear that hospital patients feel obliged to participate in such a study, but this was not the impression reached by the interviewer and patients appeared very keen to participate. Unfortunately some patients at each clinic were not interviewed. This was a problem identified by Dixon and Carr-Hill (1989) when interviews are conducted prior to the appointment. On busy clinic days, or when several patients attended at once, it was difficult for a sole interviewer to see all the patients.

One disadvantage of this research technique was that patients may not have responded accurately. Patients may have forgotten the correct answer and guess the response. Patients may be influenced by overhearing another interview, a problem of conducting the interviews within the patient waiting area. This problem was examined during the pilot study. After consideration the choice of location was the only option available. Patients may be reluctant to complain about the services they have received. Frequently in health

service studies there is a general high level of satisfaction among the consumers (Peyrot et al, 1993) and patients are generally more likely to complain about the NHS as a whole rather than individual services or service providers.

Referral initiators did not differ proportionally between the clinics and it would not be expected that they would. The CEB patients were selected on their postcodes alone and this would not be expected to bias the referral initiators.

Travel to the community clinic was on average cheaper than to attend PCC and the time spent travelling to the clinic was shorter. The clinic was set up for the convenience of the patient. These figures illustrate that it is fulfilling this need in terms of time and expenditure for the patient.

Travelling times were clearly considerable for many patients especially to the main hospital with an average of just under one hour. However, this is less than a previous MEH study where travelling times to the Contact Lens Department (CLD) were on average 1.5hrs each way (Woodward and Drummond, 1984). This may simply be accounted for by the specialist nature of the CLD which is a service not available at all eye departments.

13% patients stated that the CEB site was less convenient than the main MEH site. Allocation of appointments to the clinic are made on the area postcode. Such broad allocation may require review. It is vital that community based services are fulfilling their objective of providing a more convenient service to its patients.

Pensioners are entitled to off-peak travel passes on London Transport. These passes are only valid after 9.30am and so a proportion of patients were unable to take advantage of their pass. It may be possible to arrange clinic appointment times to try to ensure that older patients are given late morning or afternoon appointments. Younger patients are more likely to have work commitments and an early morning appointment may therefore be more appropriate.

10.4% of patients who commented on being referred to CEB expressed concern that the clinic was inferior to the care that they may have received at the main MEH site. Patients were interviewed before their initial assessment and their knowledge of the unit would have been gained either by their GP or from the patient information leaflet sent out with appointment (MEH, 1993b). The clinic appears to be meeting its objective of providing a convenient local service. The need to emphasise that this is not an inferior service is paramount. In particular, with moves within the NHS towards a more primary care led service, it is vital that patients do not perceive that they are receiving a second-class service. Despite a more convenient service, patients may still feel that the more

prestigious main hospital service is where they will receive the best care. If a patient does not feel that he/she has received the best possible care they may be more likely to seek a second opinion. The perception of quality of care received within community based services requires a lot more research. This study has identified a possible trend.

The follow-up questionnaires identified that the majority of patients were positive about the community clinic, its convenience and the need for such clinics within London. However, of concern were the replies to question 3. Only 10/47 (21.3%) patients disagreed with the statement that being seen initially at Bow was pointless as other examinations were later conducted at the main hospital. This contradicts other responses eg. question 10, which verified that patients were generally satisfied with their initial CEB assessment. It may have been that some patients misinterpreted question 3. It may show that although patients have no complaints about the service provided at CEB, they would rather have been seen initially in the main hospital, based upon the possible perception of a higher standard of care.

Patients generally had a very positive attitude towards the treatment that they received prior to attending the hospital, and the way they were dealt with at the hospital. There were a few patients who were dissatisfied, but they were in the minority. Further investigation into patient attitudes towards the care received at community clinics should be conducted, especially with the continuing extension of these services eg. MEH community clinic within Northwick Park Hospital. This may also have wider implications for NHS moves towards more community-based health provision.

5. THE PROFESSIONAL VIEW OF THE OPHTHALMIC REFERRAL PROCESS

5.1. Introduction

Any study of Ophthalmic Referrals would be incomplete without exploring the views of the professionals involved. With regular experience of referring patients, practitioners may identify weaknesses and strengths in the referral process that would be difficult to identify from within the HES. Too often changes are made to fundamental components within the system without wide spread consultation eg new GOS 18 form.

There have frequently been problems associated with obtaining the views of professionals regarding their professional practise. Morrison et al (1990) took particular care to ensure that practitioners were given anonymity in a questionnaire about their views and expectations of AEDs. It was felt important that they allayed the practitioner's fears that the questionnaires were not an audit of individual practice. Cartwright (1988) shows that there is frequently a problem in obtaining good response rates from doctors. He comments that the increase in the number of questionnaires that are being conducted, and the work load on doctors, may have a bearing on the response rates obtained.

Questionnaires to Optometrists have rarely been very successful in obtaining a large response rate. French's (1987) study about the eye examination produced a response rate of 34%, which he followed with a similar 35% the following year. Other research where Optometrists were required to give details about their referral practice over a set period has resulted in participation rates of only between 19% (Port and Pope, 1988) and 30% (Port, 1989). The best response rate was obtained with a peer review questionnaire piloted on 2,100 Optometrists (COptom, 1995). This anonymous questionnaire asked practitioners about their optometric practice and produced a response rate of 76%.

5.2. Aims and Hypotheses

This study aimed to analyse the present referral practice of ophthalmic referral by questioning GPs and OOs on their experiences and opinions. The study also set out to test the following hypotheses, stated in their null form:

- There is no relationship between the opinions of GPs towards OO referrals and the number of years that they have been qualified.
- There is no difference in the referral practice of male and female Optometrists
- There is no difference in the referral practice of Optometrists who practise in a

multiple owned practice and those in Independent practices.

- There is no relationship between the referral practice of OOs and the number of years that they have been qualified.
- There is no relationship between the referral practice of OOs and the time that they spend conducting an examination.

Referral practice for these hypotheses comprises a series of factors. These factors are: inclusion of a diagnosis in a referral, whether the OO would advise HES referral, whether the OO would advise a particular hospital or department, how the practitioner would deal with an urgent ophthalmic referral, whether the OO would telephone the AED prior to referral and the use of the new GOS18 (for practitioners in England and Wales only).

5.3. The Optometrist

Method

Piloted questionnaires were sent to OOs to obtain their views. Questionnaires were structured, piloted and most replies received before the completion of many other studies within this thesis. It is for this reason that specific points identified in other parts of this project were not expanded upon.

The study population was obtained by random sampling 4 from every 49 OOs listed in the Opticians Register 1994. OOs with no United Kingdom practice address, and hospital OOs, were excluded from the sample. The practitioner's gender and year of qualification were recorded from the register.

The questionnaire (Appendix XII) was compiled using the results of the pilot study. Various measures to increase the likelihood of a high response rate were undertaken:

- A covering letter on MEH headed paper was personally addressed to the optometrist.
- The letter advised that the questionnaires would remain anonymous. This was hoped to allay practitioners' fears that there may be criticism of their professional practise.
- All envelopes were hand written and stamped addressed envelopes were enclosed (Scott, 1961).

Questionnaires returned because the practitioner was no longer at the address were posted to the next listed OO on the register.

Returned questionnaires were coded by the author and data was analysed on the SPSS™ statistical package.

Results

603 OOs were sent questionnaires. 20 practitioners were no longer at the listed address and these questionnaires were re-posted. 427 questionnaires were returned but 9 did not contain enough data to proceed with the analysis. 416 questionnaires were included in the study; a response rate of 70.0%.

The sample and the respondent populations were compared. No statistically significant difference was found between the proportion of male and female practitioners (χ^2 df=1, p=0.70) or their year of qualification (χ^2 df=7, p=0.80).

Eye examination length (minutes), number of appointments daily and number of days examining each week, were analysed for each practitioner (Table 5.1 and Figures 5.1-5.3). Many OOs admitted conducting additional examinations because of possible litigation (Figure 5.4).

Table 5.1. Eye Examination Schedules

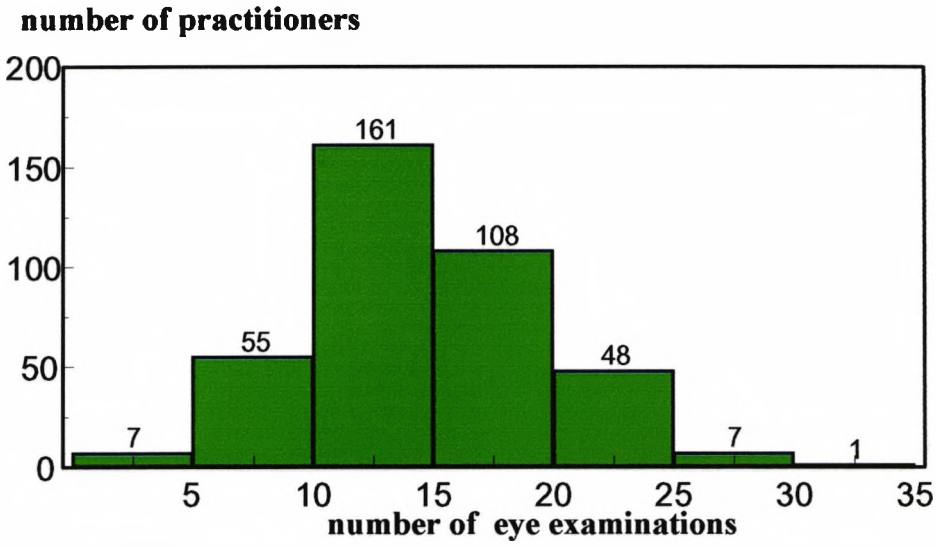
Question	$\bar{x}$	mode	median	s	$s_{\bar{x}}$	range
1)daily eye exams (nos. per day)	15.30	15.0	15.0	4.86	0.25	27
2)days practising (days per week)	4.56	5.0	5.0	1.24	0.06	6.5
3)length of appointment (mins)	27.64	30.0	30.0	7.67	0.38	45

The GOS18 form and it's Scottish and Northern Ireland equivalents, are the most frequently used formats for referral correspondence (Figure 5.5). These are most often posted or delivered directly to the GP surgery (Figure 5.6). This ensures that the referral arrives at the surgery, allows the OO to consider the referral before composing the letter, and ensures that the contents remain confidential (Figure 5.7). 34.3% OOs give the patient the referral at the end of the examination to ensure that the letter does not get mislaid at the doctor's surgery. OOs stated that they rarely receive replies from GPs following patient referral (Figure 5.8). On the Likert 7-point scale (1=very often, 7=not at all) the mean response was 5.82 (s = 1.39, $s_{\bar{x}}$=0.68).

86.3% OOs would, if known, give a diagnosis in a referral and 94.7% would also advise HES referral if they felt it was required. Only 30.3% would go as far as recommending a particular hospital or department.

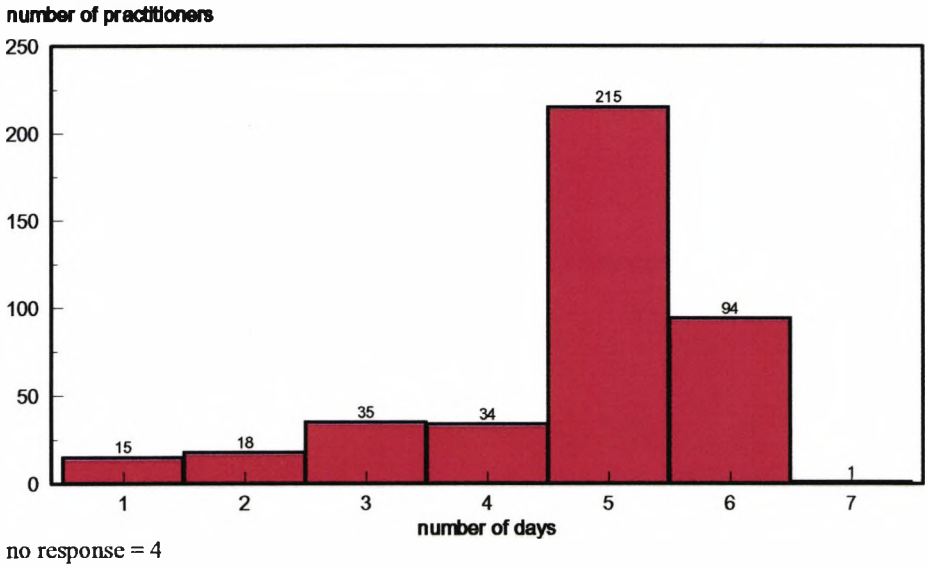
79.1% OOs refer patients who require urgent ophthalmic treatment direct to the hospital; either to an AED, or in some areas directly to the ophthalmic OPD. Referrals to the GP

Figure 5.1. 1. How many available eye examination appointments do you usually have each day?



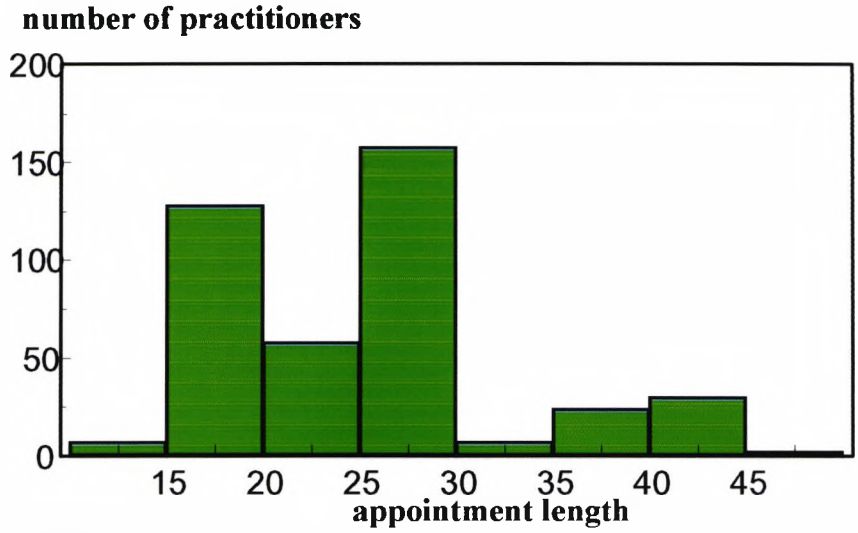
no response = 29

Figure 5.2. 2. How many days each week do you practise?



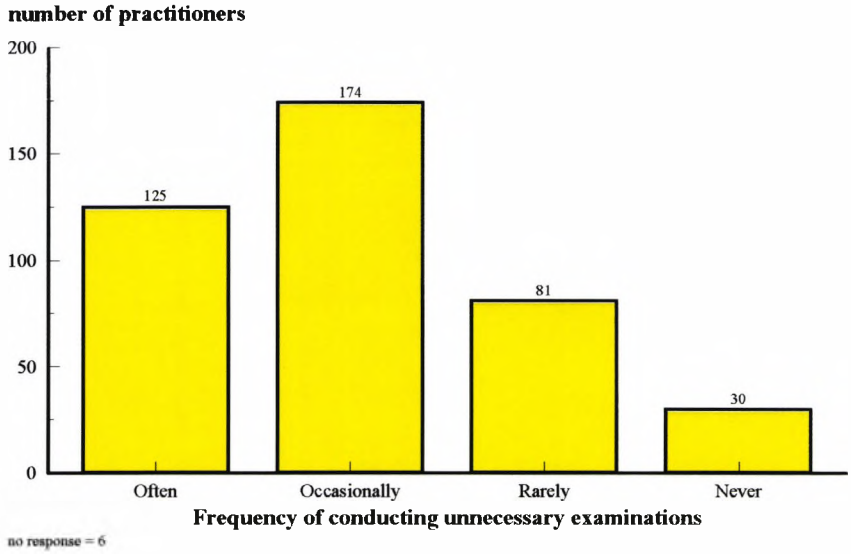
no response = 4

Figure 5.3. 3. What length of appointment time do you book for each patient?



no response = 3

Figure 5.4. 4. Do you carry out additional tests within the eye examination which you know are not relevant for a particular patient just because you feel you need to cover yourself incase of a negligence claim?

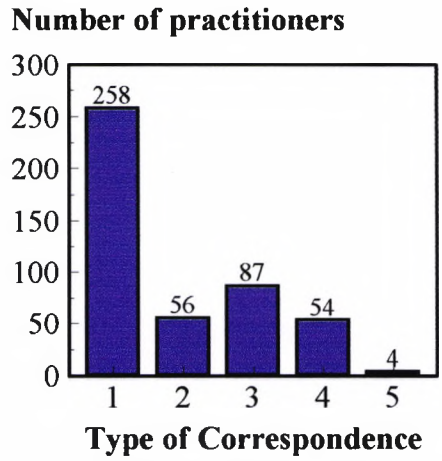


no response = 6

Figure 5.5. 5. What type of correspondence do you most often use when referring a patient to their own doctor?

KEY

1. GOS 18 or equivalent
2. Handwritten letter
3. Typed letter
4. Company/self-styled form
5. Other

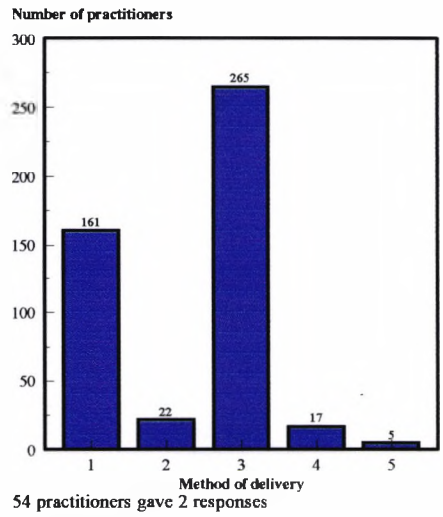


43 practitioners gave 2 responses
no response = 0

Figure 5.6. 6. How does your referral letter usually get to the doctor's surgery?

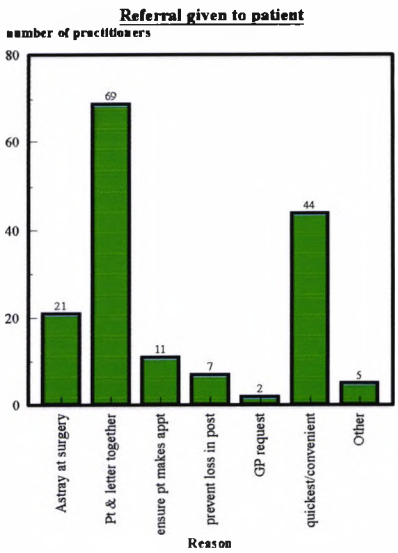
KEY

1. Handed to patient at the end of the appointment
2. Handed to the patient at a later date
3. Delivered to the doctors surgery
4. Posted to the patient
5. Other



54 practitioners gave 2 responses
no response = 0

Figure 5.7. 7. Why do you use this method to get your referral letter to the doctor's sugery



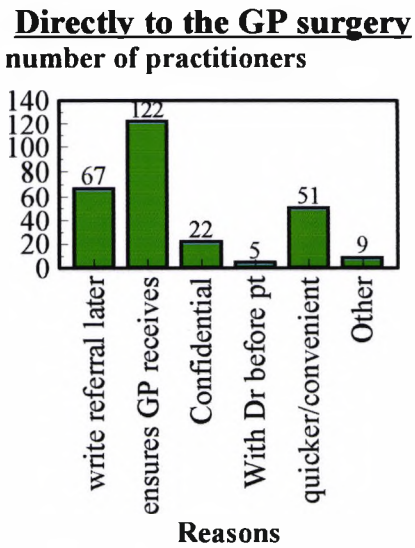
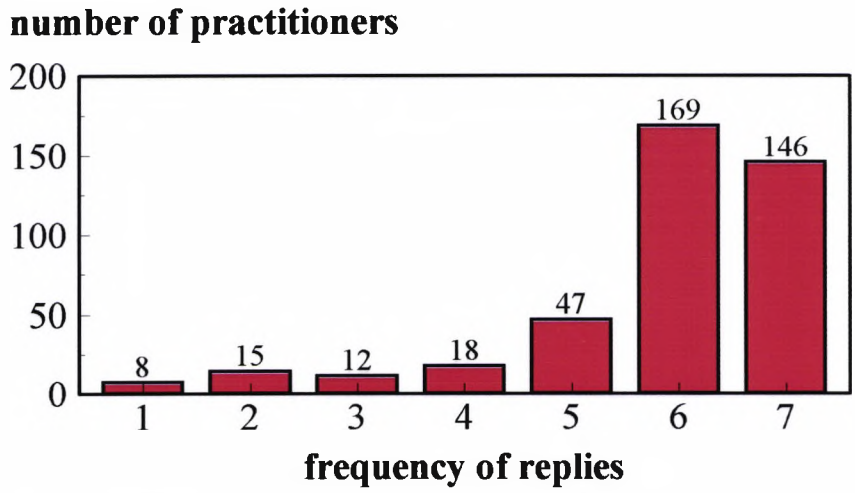


Figure 5.8. 8. How often do you receive correspondence directly from the patients doctor following referral



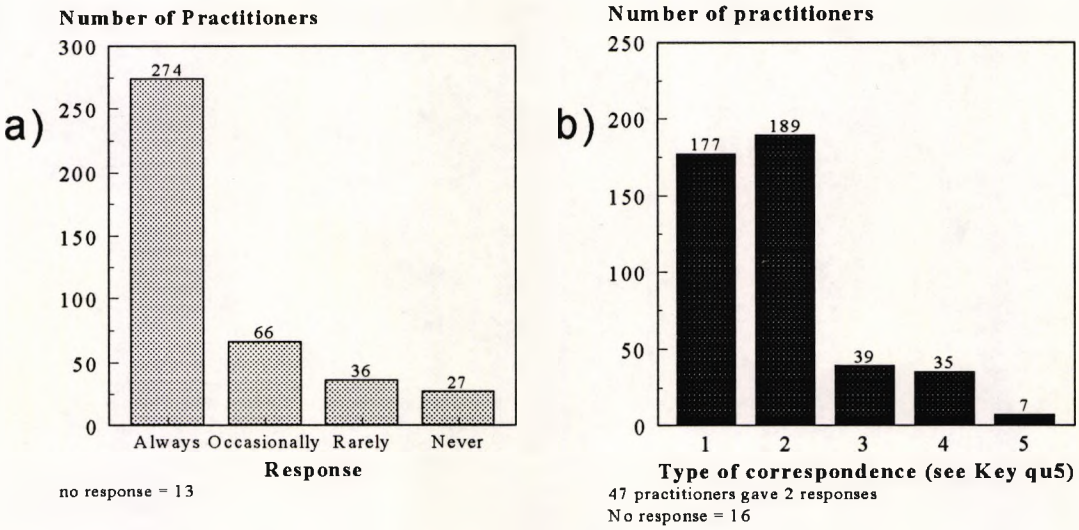
no response = 1

would be made by 11.1%, and the remainder felt that it would depend on the circumstances whether the primary or secondary health sector should deal with the condition. 33.2% OOs sometimes telephone the hospital prior to making a direct urgent referral. Reasons given included requesting advice, checking that staff/facilities were available, advising the department to expect the patient and asking the expected waiting time. Handwritten letters are used to refer patients to an AED by more practitioners than other formats (Figure 5.9.b). The majority of OOs (65.9%) always contact the patient's GP to inform him/her of action taken (Figure 5.9.a).

Figure 5.9.

a. 14) Do you write to the patients doctor following a referral to A&E?

b. 15) Which type of correspondence do you use to send a patient to A&E?



13.5% OOs stated that they refer patients to the HES other than in an emergency. The main reasons given were: continuing care required of HES patient (31/57), orthoptic patients (6/57), patients without a GP (5/57), when GPs will not refer to HES (3/57) and diabetic patients in shared care schemes (4/57).

The new GOS18 form responses (questions 17-23) were analysed for respondents practising in England and Wales only. 86.9% (311/358) practitioners stated that they were aware of the new forms and it had been used by 81.6% (253/310). Opinions about the new form were very mixed (Figure 5.10). 53.5% of the responses were negative.

Patients can sign the new GOS18 giving permission for the practitioner to receive information. 27.4% (68/248) practitioners do not get patients to complete this section and

41.5% (103/248) ask for it to be signed 'sometimes'. Only 3 out of 214 practitioners had ever had any patient refuse to sign this form (1.4%). 4.8% (8/167) OOs felt this section was an important addition to the form (question 22), but many practitioners were unable to ask patients to sign when they write their referral letters at the end of the clinic session (43/167).

The most frequent reply was that the section was unnecessary (65/167) and that feedback should be automatic (Figure 5.11). 84.7% (211/249) practitioners had noticed no difference in the number of replies that they receive when using the new GOS 18. 8% felt they are receiving more replies but 7.2% felt that they are not receiving as many.

Figure 5.10. 18) What is your opinion of the new GOS18?

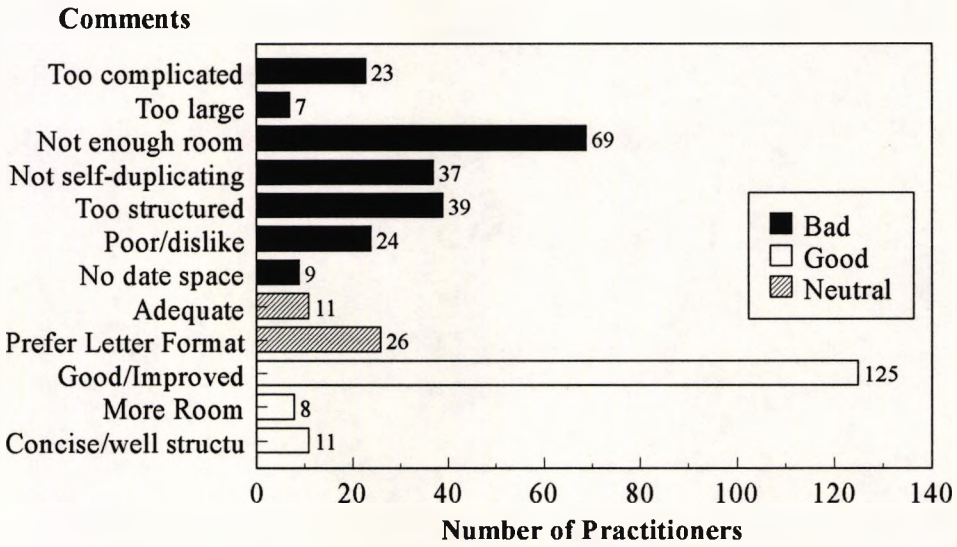
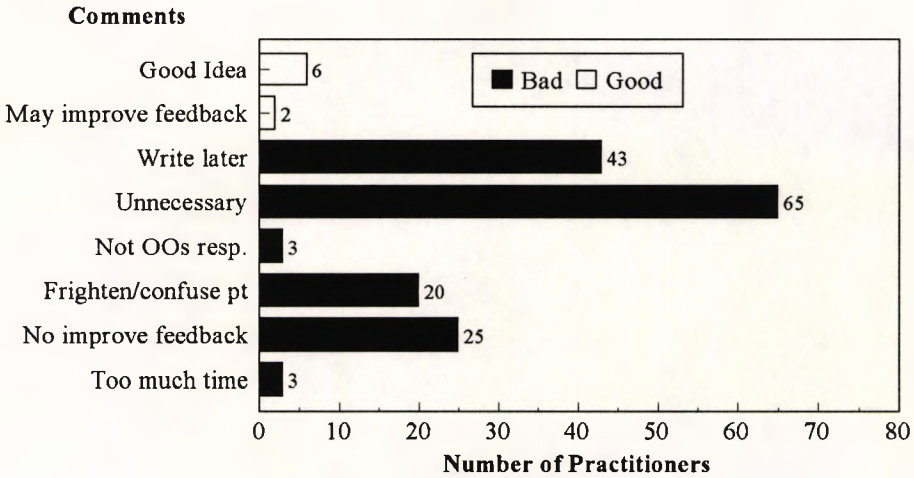


Figure 5.11. 22) Please give any comments that you may have about the patient's signature of permission on the new GOS18.



94.9% respondents were members or fellows of the College of Optometrists and 86% respondents had read the COptom guidelines on referral. The title British College of Optometrists was used when the questionnaire was posted.

Direct referral would be welcomed by 48.2% of OOs and a further 22.3% were positive but had certain reservations. However, only 4.6% of practitioners felt that patients would never benefit from direct referral (Figure 5.12) and this reduced to 3.6% OOs when the question was more specific (qu.28). OOs felt that patients with suspected glaucoma were most likely to benefit from direct referral (Figure 5.13).

Figure 5.12. 27) Financial constraints aside, do you feel that patients may benefit from a direct referral from yourself to the HES for non-urgent ophthalmic problems?

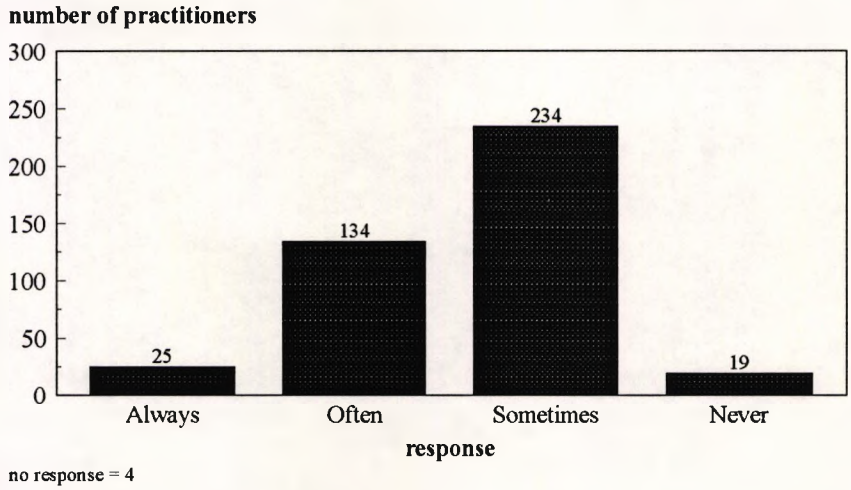
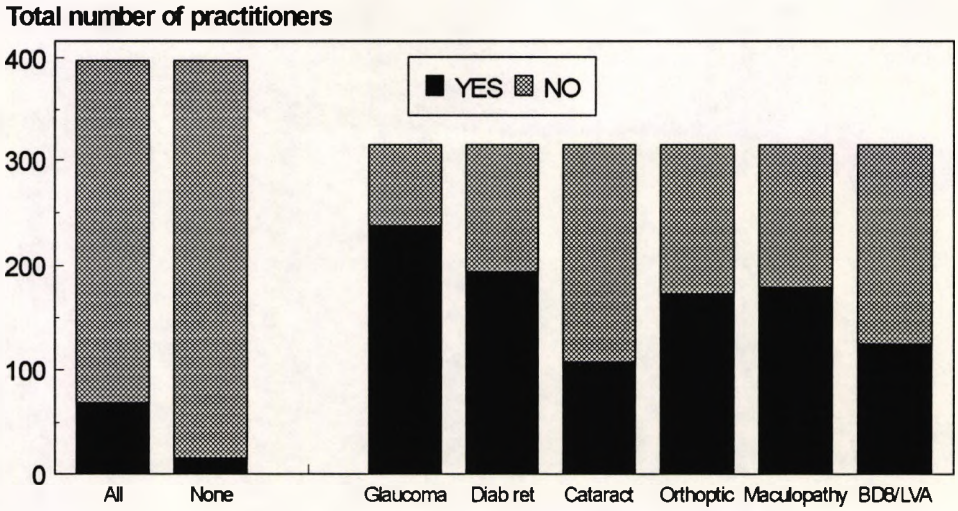


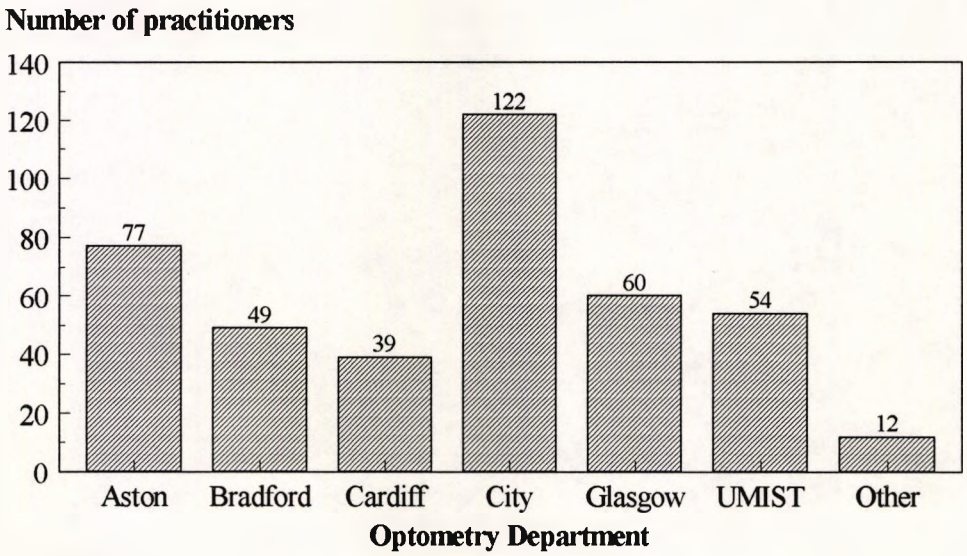
Figure 5.13. 28) Are there any particular groups of patients that you feel would benefit from direct referral?



43.3% practitioners added additional comments in question 29 and 'lack of feedback' was the most frequent remark (53.3%). 7.7% OOs felt that the present system took too long and a further 6.1% were concerned about the waiting times at outpatient clinics in their areas.

The University/College at which the OO trained is illustrated in Figure 5.14. City University trained 29.5% OOs who responded to this study. 'Other' includes OOs who were trained abroad including students from Eire.

Figure 5.14. 34) At which University/College did you train?



no response = 3

Comparing the respondent population with the profession

64.9% respondents were male and the gender distribution was not significantly different from the male/female distribution taken from the GOC register at the end of 1994 (χ^2, df=1, p=0.10).

Figure 5.15 illustrates the rapid increase in the number of registered practitioners since the late 1970s. Question 33 had been read as country rather than county by many practitioners and only a national break down was feasible (Figure 5.16). There was no significant difference between the proportions of practitioners working in each country (England, N.Ireland, Scotland and Wales) as recorded by the GOC compared with the respondent population (χ^2, df=3, p=0.70).

Figure 5.14. Year of Qualifying

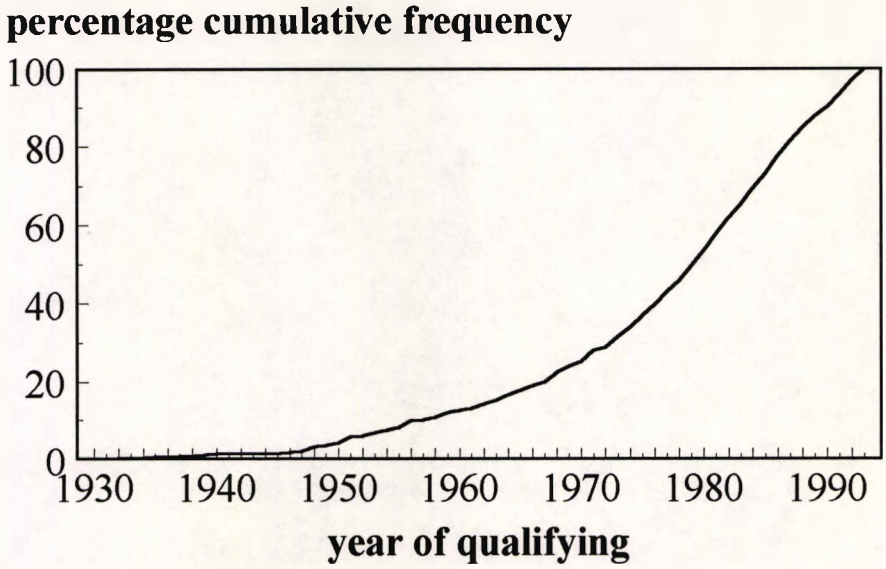
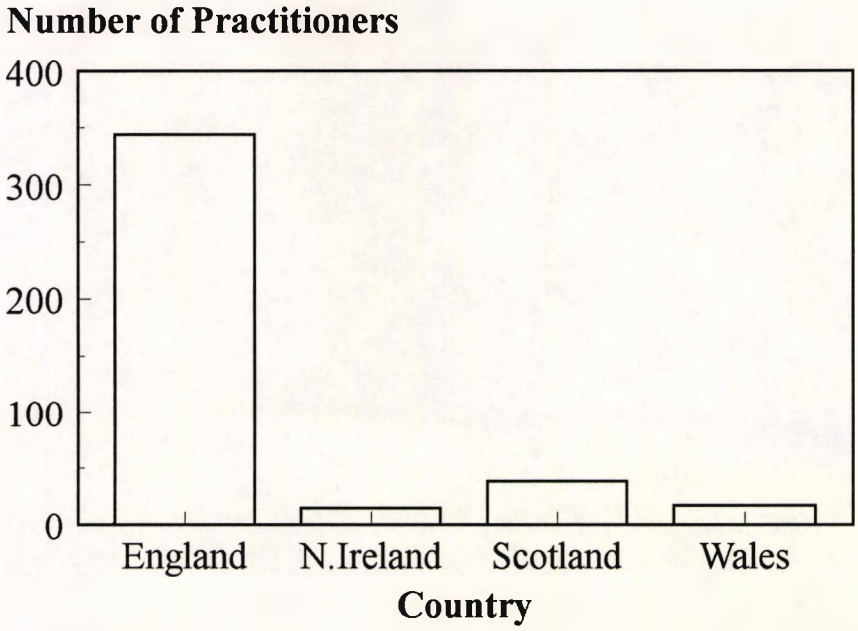


Figure 5.15. National Distribution of Practitioners



missing = 2

Gender as a factor in referral practice

Table 5.2 displays the analysis of this variable. Female OOs were statistically more likely to conduct more examinations daily than their male colleagues and in consequence they conducted shorter eye examinations. They did not work as many days each week and were more likely to work for a multiple than an independent practice. Male OOs had, on average, been qualified longer than female members of the profession. However, there was no significant difference between the referral practice or opinions of male and female practitioners and the null hypothesis was accepted.

Practice Type as a factor in referral practise

2.9% respondents who in both independent and multiple optometry practices were not included in this analysis (Table 5.3). The majority worked in independent practices (72.8%). Practitioners working in independent practices had longer appointment times and consequently fewer appointments booked each day. These practitioners were also statistically more likely to be male and to have been qualified optometrists for longer. The type of practice in which a female practitioner conducted examinations was also dependent on the University/College where she trained. It appears that an Aston University female student was more likely to work for a multiple ($p=0.55$) than a City University female student ($p=0.20$).

OOs working in Independent practices were more likely to specify a particular hospital or department in their referral than their colleagues in multiple practices. For patients suffering from urgent ophthalmic conditions, all practitioners were more likely to refer patients to the HES, but independent practitioners were more likely than OOs working in a multiple to refer urgent ophthalmic patients to their GP.

OOs practising in England and Wales who use the new GOS18 form were more likely to ask their patient to sign the form if they worked in an independent practice rather than a multiple. The null hypothesis was therefore rejected. There was a difference in the referral practice of OOs who practise in a multiple practice and those in independent practices.

Number of Years Qualified as a factor in Referral practice

The longest practising OO in this study qualified in 1932 (Figure 5.14). The number of years qualified was analysed as a dependent variable in this study (Table 5.4).

Female practitioners had not been qualified as long as their male colleagues and the longer

Table 5.2. Effect of Gender on Practice and Referral Characteristics

Variable	Analysis
1.daily appointments	U=13838.5**
2.days practised each week	U=12957.0***
3.Appointment length	t=2.28
4.Fear of negligence	χ^2=2.25 (df=3)
8.Replies	U=18964.5
9.Diagnosis	χ^2=1.43 (df=1)
10.Advise HES	χ^2=0.93 (df=1)
11.Advise hosp/dept	χ^2=0.02 (df=1)
12.Urgent referral	χ^2=2.25 (df=2)
13.Phone HES	χ^2=1.21 (df=1)
14.Write to GP	χ^2=3.12 (df=3)
16.Direct	χ^2=0.33 (df=1)
17.New GOS18‡	χ^2=1.25 (df=1)
19.Used GOS18‡	χ^2=0.54 (df=1)
20.Pt signature‡	χ^2=4.19 (df=1)
21.Pt refused‡	sample too small
23.feedback‡	χ^2=5.56 (df=2)
24.Fellow/Member BCO	χ^2=0.08 (df=1)
25.BCO Guidelines	χ^2=2.61 (df=1)
26.Direct refer (open)	χ^2=0.330 (df=1)
27.Direct refer (closed)	χ^2=4.21 (df=2)
30.Year qualified	U=12170.0***
32.Practice type	χ^2=22.05*** (df=2)
34.Training	χ^2=0.39 (df=6)

Key

***p=<0.05**
****p=<0.01**
*****p=<0.001**
‡=England and Wales only

Table 5.3. Effect of Practice Type on Practice and Referral Characteristics

Variable	Analysis
1.daily appointments	U=3190.0***
2.days practised each week	U=14729.0
3.Appointment length	t=-14.19***
4.Fear of negligence	χ^2=2.63 (df=3)
8.Replies	sample too small
9.Diagnosis	χ^2=0.33 (df=1)
10.Advise HES	χ^2=0.29 (df=1)
11.Advise hosp/dept	χ^2=0.03 (df=1)
12.Urgent referral	χ^2=6.28* (df=2)
13.Phone HES	χ^2=2.32 (df=1)
14.Write to GP	χ^2=2.00 (df=3)
16.Direct	χ^2=0.21 (df=1)
17.New GOS18‡	χ^2=1.49 (df=1)
19.Used GOS18‡	χ^2=3.45 (df=1)
20.Pt signature‡	χ^2=7.32* (df=2)
21.Pt refused‡	sample too small
23.feedback‡	χ^2=0.11 (df=2)
24.Fellow/Member BCO	χ^2=0.02 (df=1)
25.BCO Guidelines	χ^2=1.26 (df=1)
26.Direct refer (open)	χ^2=0.32 (df=1)
27.Direct refer (closed)	χ^2=0.21 (df=2)
30.Year qualified	U=9029.5***
32.Gender	χ^2=22.05*** (df=2)
34.Training	χ^2=44.87***

Key

***p=<0.05**

****p=<0.01**

*****p=<0.001**

‡=England and Wales only

Table 5.4 Effect of Years Qualified on Practice and Referral Characteristics

Variable	Analysis
1.daily appointments	χ^2=75.07***† df=24
2.days practised each week	χ^2=15.87*† df=7
3.Appointment length	χ^2=45.54***† df=14
4.Fear of negligence	χ^2=8.52*† df=3
8.Replies	χ^2=11.31† df=6
9.Diagnosis	U=8317.0*
10.Advise HES	U=2400.5**
11.Advise hosp/dept	U=17287.5
12.Urgent referral	U=5997.5*
13.Phone HES	U=17394.5
16.Direct	U=8605.5
17.New GOS18‡	U=5872.0*
24.Fellow/Member	U=2992.0*
19.Used GOS18	U=5872.0*
26.Direct refer (open)	χ^2=2.49† (df=2)
27.Direct refer (closed)	χ^2=10.76**
31.Gender	U=12170.0***
32.Practice	U=9029.5***
34.Training	χ^2=34.71***†

Key

*p=<0.05

**p=<0.01

***p=<0.001

†=Kruskal-Wallis 1 way Anova - χ^2 corrected for ties.

‡=England and Wales only

Table 5.5 Effect of Length of Eye Examination on Practice and Referral Characteristics

Factor	Analysis
2.days practised each week	χ^2=6.64† df=7
4.Fear of negligence	χ^2=0.24† df=3
8.Replies	χ^2=5.04† df=6
9.Diagnosis	t=1.06
10.Advise HES	t=0.74
11.Advise hosp/dept	t=-0.95
12.Urgent referral	t=-2.25*
13.Phone HES	t=-0.14
16.Direct	t=1.96*
17.New GOS18‡	t=1.43
24.Fellow/Member	t=-0.65
19.Used GOS18‡	t=2.41*
26.Direct refer (open)	χ^2=3.51† (df=2)
27.Direct refer (closed)	χ^2=2.70† (df=3)
31.Gender	t=2.28
32.Practice	t=-14.19
34.Training	χ^2=21.03**†

Key

***p=<0.05**

****p=<0.01**

*****p=<0.001**

†=Kruskal-Wallis 1 way Anova - χ^2 corrected for ties.

‡=England and Wales only

a practitioner had been qualified the more likely he/she was to work in an independent practice. The OO who had been qualified longer would be more likely to conduct longer eye examinations, book fewer patients each day and practise fewer days each week. He/she would also be less concerned about the possibility of being sued for negligence and

would be more likely to have feedback from referrals, though this was not significant. These practitioners were also more negative towards the question of direct referrals.

The longer qualified OO was less likely to be aware of the new GOS18 form and be less likely to be a member or fellow of the COptom.

Being qualified longer meant that the OO was less likely to state the diagnosis in the referral letter and less likely to advise that HES referral was required. Although all practitioners were more likely to refer patients to the HES for an urgent ophthalmic condition, the OO who had been qualified longer was more likely than his/her more recently qualified colleague to refer to the patient's GP.

The null hypothesis was therefore rejected. There was a relationship between the referral practice of OOs and the number of years that they have been qualified.

Length of Eye Examination as a factor in Referral Practice

A practitioner who conducts shorter eye examinations was more likely to refer patients directly to the HES for non-urgent appointments. Also an OO who conducted a longer eye examination was also more likely to ask the patient to sign the section on the new GOS18 form. The null hypothesis was therefore rejected. There was a relationship between the referral practice of OOs and the time they spent conducting an eye examination.

The University/College at which an OO trained also affected the length of eye examinations which he/she conducted. OOs trained at Aston University conducted shorter eye examinations than OOs who trained at City University.

Exploring relationships between Variables

Correlation Coefficient Pearson (r) and Spearmans Rank Order Correlation Coefficient (r_s) were calculated as appropriate. The only linear relationship was between the number of eye examinations conducted each day and the length of eye examinations conducted ($r=-0.74$).

5.4. Discussion

The high response rate was very encouraging. The respondent population was representative of the whole profession. The non-response factor was not likely to affect the conclusions drawn.

A median of 30 minutes for an eye examination was shorter than work conducted by Dunn

(1986) and longer than French's study (1987). Dunn (1986) conducted four studies over a thirty year period into "time for routine optometric examination" (n=320). His results showed a bimodal distribution with a median of between 40 and 45 mins in 1955, falling to 35-40 mins in 1985. French's (1987) study in 1986 sent questionnaires to all optometrists on the GOC register. No consideration was given to non-practising or hospital optometrists, or the possible bias associated with the poor response rate (34%). He discovered a median time of 25 minutes. Since these studies the NHS eye examination is no longer available to everyone (Health and Medicines Act 1988) and 53% patients are examined privately (Federation of Ophthalmic and Dispensing Opticians, 1995).

The majority of practitioners practised 5 days weekly. Women worked less than their male colleagues, possibly because of their responsibilities to dependants. Older OOs were also less likely to practise as many days each week and may be taking advantages of semi-retirement.

Despite the number of disciplinary cases heard by the GOC for Professional misconduct over recent years remaining very low (Webster, 1995), cases have been widely reported in the Optical Press. It is not surprising that many practitioners expressed concern. Interestingly, OOs who have been qualified longer expressed less concerned about negligence claims. This may be due to their confidence because of greater experience or their lack of awareness of the changing role of optometry.

Older practitioners may not be as concerned by the possibility of negligence claims but the fact that their referral letters include no diagnosis and do not advise HES referral when it is required, may illustrate a lack of confidence in their abilities. It may also be linked to the view often held that the OO is not a diagnostician. The COptom guidelines state that practitioners should specify the diagnosis if they know what it is, in order to facilitate better care for the patient.

Despite many eye examinations no longer being conducted as part of the GOS, the GOS18 form is widely used. The new GOS18 form is only available to practitioners in England and Wales which was not appreciated before the questionnaires were posted. The main advantage stated was its increased size over the old style. This gives the OO the opportunity of providing a greater amount of information. However, in contradiction, lack of room was the main complaint of the new form. Whether these practitioners also found lack of room a complaint of the old form is unclear. However the old GOS18 form did allow practitioners to continue overleaf. The new self-carbonating style prevents this. The complaint regarding self-carbonating pages has been addressed and correctly

produced forms are available (HSE(94)2). The new structured lay out of the new form was also widely disliked. It was felt to be designed specifically for glaucoma referrals. The need for patients to sign so that practitioners may receive feedback was largely felt to be unnecessary; practitioners are not aware of any increase in their feedback. A small study by Frost (1995) showed that there was no significant difference in using the new GOS18 signed, the new GOS unsigned and the old GOS18. Joint guidance from the AOP and BMA states that;

"It is ESSENTIAL that the patient signs and dates the form to indicate his or her consent for the ophthalmologist to make available relevant information to the optometrist/OMP." and if the OO/OMP is using another form or letter an additional consent form "must" be signed by the patient.

The lack of feedback from referrals was evident from the questionnaire. It was the main complaint practitioners had about the present referral process. The majority of practitioners were unaware that the new GOS18 had affected the amount of feedback received. It is acknowledged that feedback can change referral practice and many new shared-care schemes incorporate an audit to allow OOs to assess their own performance (AOP, 1994: Gatling et al, 1995; Giltrow-Tyler, 1996; RCOphth, 1996). Replies do vary depending on the location eg Warrington Primary Care Clinic sends copies of the GPs reply to the Optometrist associated with the referral (Peckar et al, 1994).

It is disappointing that the new GOS18 has not been widely accepted. Any referral format will clearly never be totally accepted. The problem is not limited to Optometry, Roland (1992b) comments that overwhelming opposition was met when attempts were made to introduce a nationally standardised format for general medical referrals. In future, any redesigned of the GOS18 form should involve greater consultation with the professions preferably at local level. There appears to be no reason that such a form needs to be designed nationally. It would then be possible for local Ophthalmic Consultants, General Practitioners, Optometrists and Ophthalmic Medical Practitioners to design a form that would be acceptable to meet local needs.

Direct referral to a hospital in an ophthalmic emergency is good practice if it is in the best interests of the patient (COptom, 1991). The College of Optometrist's Guidelines state that,

"in urgent cases, the patient must be sent to a Hospital Eye Department with a letter of referral, and the patients General Medical Practitioner notified of what has happened and why". Local difficulties may affect the availability of hospital services in remote areas and

the patient's needs may best be met by referring to the GP. Also GPs who have specialist training and relevant examination equipment may be able to deal with some ocular emergencies and referral would be appropriate.

The nature of emergency referrals makes a letter format the easiest to complete quickly. The responses to this questionnaire reflect the wide use of the letter format identified in the AED study (Chapter 3). The fact that many practitioners do not contact the GP to inform him/her of the referral is against the COptom advice.

The majority of OOs favoured direct referral but responses depended on question style; closed style questioning resulted in a more positive response. Direct referral was not felt to be appropriate for all ocular conditions. The majority of OOs felt that glaucoma suspects would benefit from direct referral. Patients suffering from maculopathy and diabetic retinopathy were also considered ideal candidates for direct HES referral.

Boggon (1992) conducted a small study of GPs and OOs in the Tayside region. He found that most Optometrists and 60% General Practitioners felt that direct referral of patients to hospital ophthalmology OPDs would be appropriate.

Two Scottish studies in the early eighties (Howie and Taylor, 1982; Kljakovic et al, 1985) called for the ophthalmic referral process to be reviewed allowing OOs to refer their glaucoma patients directly to the HES. 87% of GPs had agreed that OOs should be able to directly refer suspect glaucoma patients to an Ophthalmologist (Howie and Taylor, 1982).

Tuck and Crick's (1991) glaucoma study is the only known research that follows OO referrals through the whole process ie. via the GP to the HES. They identified that in about a third of the 125 cases, where patients did not attend for an HES examination, it was the GP who had decided against onward referral. This was despite the fact that some patients were in the high risk categories.

Perkins (1990) reported that he referred on to the HES 82% OO referrals. The 11 patients who were not referred on consisted; 1 refused referral, 3 patients who had already seen the Ophthalmologist where no further action was required, 2 patients who were already under HES review, 2 patients referred for headaches with no ocular problems, 1 suspected glaucoma who was not referred on due to low risk, a colour blind child and a cataract patient with major medical problems where referral would have been unwise.

A small number of OOs were identified as referring patients directly to the HES in the questionnaire. This group included patients already receiving treatment where the condition had changed. This may be classified as an information-only letter which aids the

care provided by the hospital, rather than an actual referral. At present direct OO referrals may not be treated unless the referral is confirmed by the patient's GP, especially if the GP is fundholding.

It appears that there are many problems with the present ophthalmic referral process that have been revealed through this questionnaire. In particular OOs are failing to receive replies to their referrals, a wasted opportunity for continuing education. This also prevents OOs reviewing their individual referral protocols. Direct referral is clearly felt by OOs to be a step that would benefit the suspected glaucoma patient, and possibly diabetic retinopathy and maculopathy sufferers as well. Other conditions eg. cataract, are not sight-threatening. Any delay caused by these patients being referred to the GP initially would be unlikely to cause lasting damage to the patient's eyesight. It is important that direct referral of sight threatening conditions is seriously considered by the relevant bodies in the light of these views.

5.5. The General Practitioner

Method

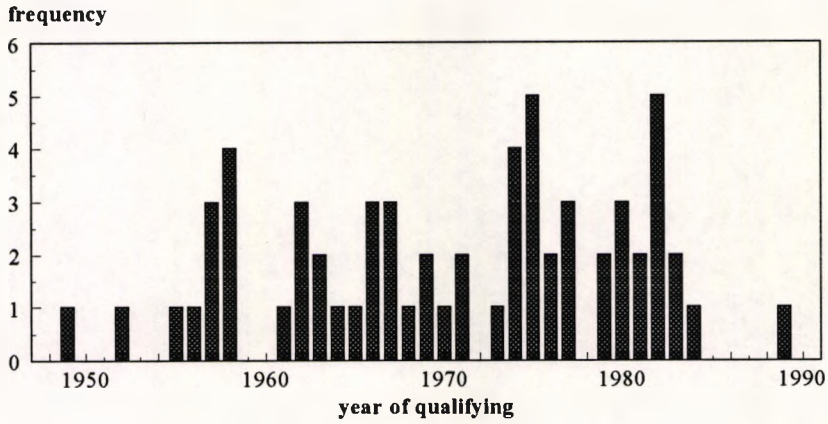
A questionnaire about the ophthalmic referral process was sent to 97 GPs after a pilot study. The study was completed before the completion of many other studies within this thesis. The sample comprised GPs with high referral rates to PCC and CEB. This group of practitioners referred between 52 and 18 patients the previous year. The questionnaire had previously been comprehensively piloted using a sample of 30 GPs. Questionnaires were posted with a stamped addressed envelope enclosed and all replies remained anonymous to encourage returns. It was hoped that this would allay practitioner's fears that there may be criticism of their individual professional practise. It was also felt important that the questionnaire should be kept short as GPs frequently have a heavy workload. The questionnaire was kept to 2 double sided A4 sheets and the estimated completion time was under five minutes (Appendix XIII). A covering letter was sent with the questionnaire explaining the purpose of the survey.

Results

64 (65.98%) questionnaires were returned. Two questionnaires were inadequately completed and were not included in the study. Results were analysed using the SPSS™ statistical software package.

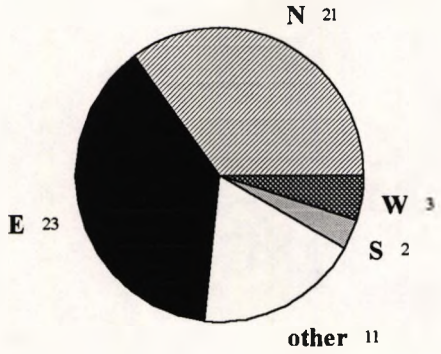
The mean number of years qualified was 24 (s=9.50, $s_{\bar{x}}$=1.21, Figure 5.17). The majority of GPs practise in the north and east of the city (73.3%, Figure 5.18).

Figure 5.17. Number of Years GP has been Qualified



N=62, $\bar{x}$=70.48, s=9.50, $s_{\bar{x}}$=1.20

Figure 5.18. Practice Location

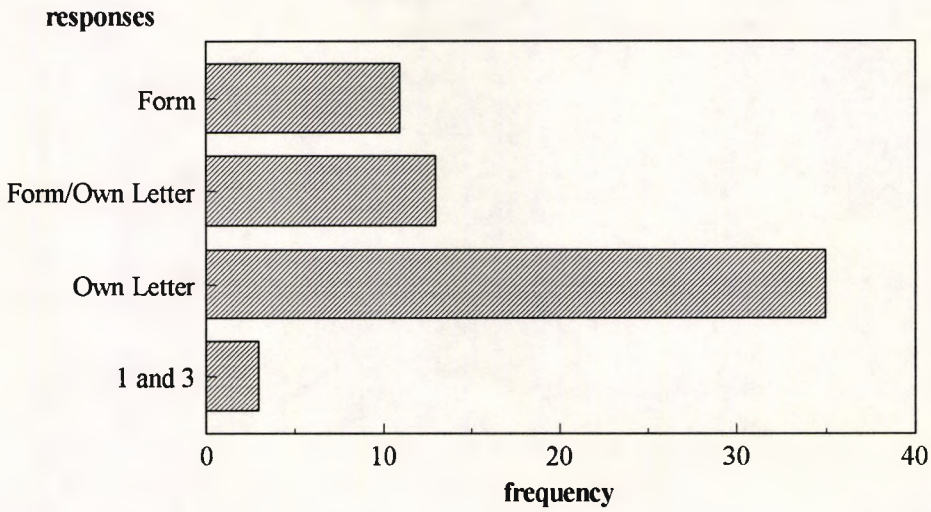


N=60

The amount of correspondence received from OOs varies considerably between GPs. 50.8% GPs receive less than one referral weekly and 43.4% receive less than one 'information only' letter.

Just over half (53.2%) of GPs reported receiving a copy of the new GOS18. 20 respondents commented on the new GOS18 form; they were generally very positive about the layout. The new layout was felt to provide more room for clinical information from the OO or OMP. 3 practitioners showed disaffection. Only 2 (3.2%) GPs always make use of the GP section on the GOS 18 form; 72.6% always write their own correspondence (Figure 5.19).

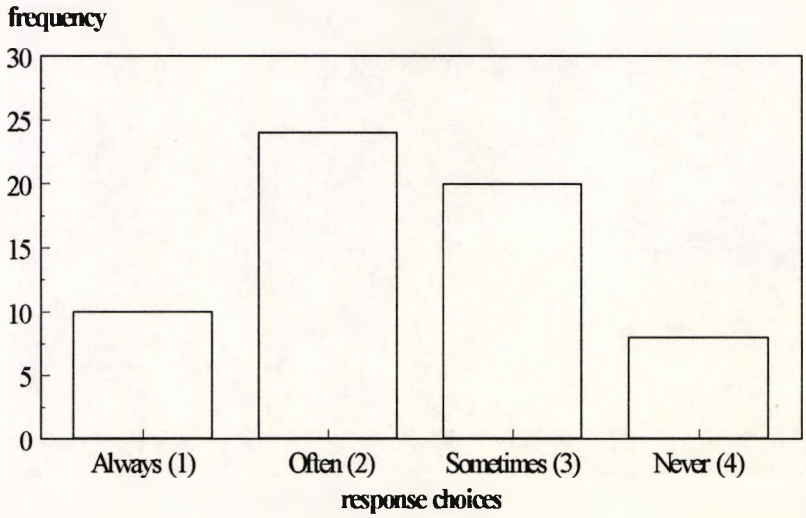
Figure 5.19. 4) Do you ever fill in the GP section on an optometrist's referral form, or do you write your own letter?



N=62

The majority of GPs feel that 'sometimes' they are simply conducting an administration task, forwarding OO referrals to the HES (Figure 5.20). There was no significant difference between a positive or negative response to this question and the number of years a GP had been qualified (p=0.06, Mann-Whitney U test). The reaction of GPs to direct referral by OOs was positive (Figure 5.21).

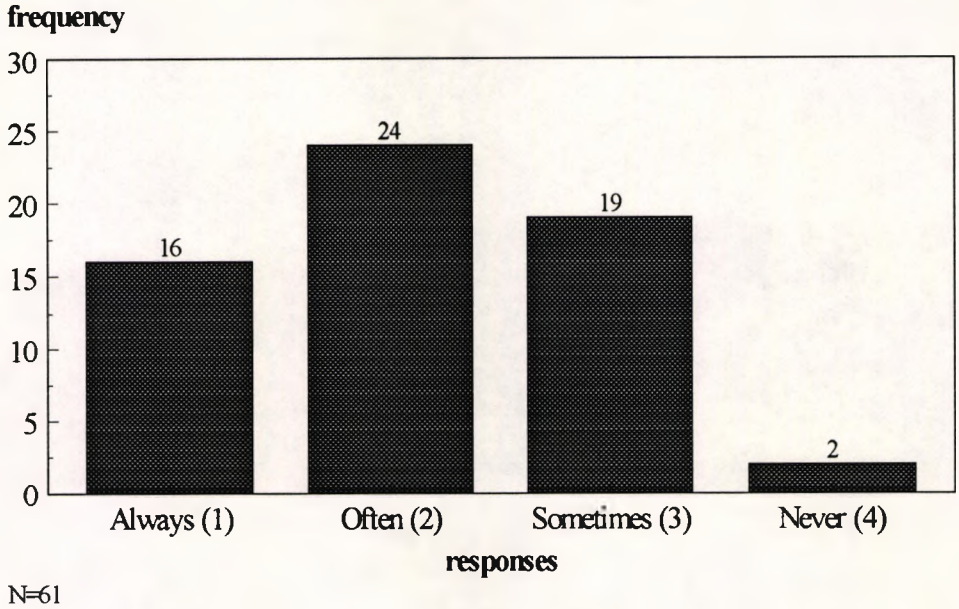
Figure 5.20. 3) Do you feel that referring a patient on to the HES that has been referred to you by an optometrist is just an administration task?



N=62

($\bar{x}$=2.42)

Figure 5.21. 13) Optometrists refer urgent ophthalmic cases directly to the casualty department. Financial constraints aside, do you feel that patients may benefit from direct referral from the optometrist to the HES for non-urgent ophthalmic problems?

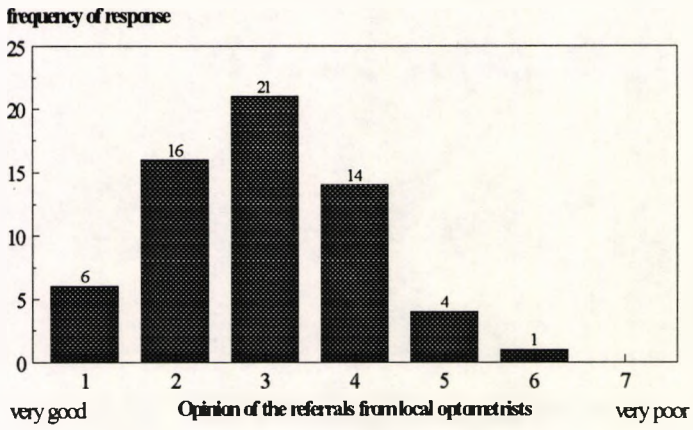


($\bar{x}$=2.12)

GPs views of OO referrals varied; the mean response (1=very good, 7=very poor) was 2.95 (s=1.14, $s_{\bar{x}}$=0.14, Figure 5.22). The GP's opinion of OO referrals did not vary with number of years qualified (p=0.80 Kruskal Wallis one-way ANOVA, df=5) and the null hypothesis was therefore accepted.

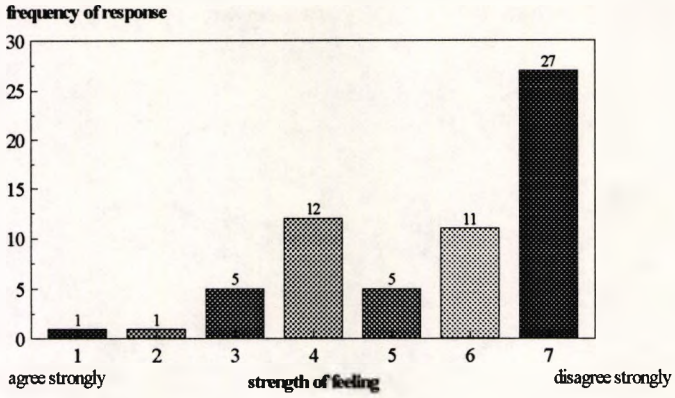
50% GPs stated that they referred patients to the HES who they would previously have

Figure 5.22. 5) What is your opinion on the standard of the referrals that you receive from local optometrists?



N=62, $\bar{x}$=2.95, s=1.14, $s_{\bar{x}}$=0.14

Figure 5.23. 8) How do you feel about patients having to pay for eye examinations now?



N=62, $\bar{x}$=5.58, s=1.60, $s_{\bar{x}}$=0.20

referred to the local optometrist prior to the reduction in availability of NHS eye examinations. 70% gave a negative response on the Likert scale to the implementation of eye examination charges (Figure 5.23). 45% replied that they disagreed strongly (7 on the scale). Only 11% gave a positive response.

Reasons for a possible delay between the patient consulting the OO and thereafter the GP were put forward. 70.4% (19/27) felt that the patient was at fault. Either he/she delayed in making an appointment with the GP or forget to deliver the letter. Administration problems and delay in making a referral decision on the part of the GP were felt to be the delaying factor by only a few GPs (4/27) as was poor instruction by the OO (4/27).

Questions 10 and 11 were answered incorrectly. Despite the term 'not' being printed in bold type face, responses varied from 0-100%. This data was not analysed.

66% GPs said that they would refer a patient to the HES even if they felt it was unnecessary, just because the OO had advised this course of action. Older practitioners were more likely to be part of this group (p=0.05, Mann Whitney U $test_{1\text{-}tail}$).

The vast majority of GPs (74.6%) never reply to the OO after a referral. One GP felt this was the responsibility of the hospital because the referral letter from the OO is forwarded when the appointment is requested.

The information letters sent by the OO to the GP regarding diabetics and glaucoma patients are useful. Just over half (51.7%) GPs prefer the present system where OOs inform the GP after every examination.

79% respondents said that they were happy with the replies from the PCC/CEB. However, GPs wanted much more information included in the letter regarding all aspects

of the patients ophthalmic care (Table 5.5).

Table 5.6. GP Comments on PCC Replies to Referrals

Question 9 - Comments	f
less abbreviations and jargon	4
more information (general)	4
more information - clinical and patient management	8
more information - MEH structure	2
name of Consultant to whom patients referred	1
more personal letters	2
ensure letters are actually sent	2
prompt replies	3
happy with present correspondence	5
correspondence has improved recently	3

f= frequency of response

NB. Several GPs commented on AED correspondence but these comments have not been included in this study

5.6. Discussion

A response rate of over 60% was very encouraging and demonstrates the positive attitude of GPs towards ophthalmology. The sample was not selected randomly and the respondents are not felt to be representative of GPs as a whole. The sample was chosen because of their high referral rates to MEH. It was hoped that their knowledge of the ophthalmic referral process would be more extensive.

Questionnaires remained anonymous. This was felt to be important because several questions analysed the GPs professional judgement. It is hoped that this may also have encouraged GPs to reply and to be candid in their responses.

The length of time qualified was evenly distributed across the 40 year range. This was felt to enhance any analysis since the views of a wide range of experienced and more recently qualified practitioners were included. The responding GPs were mainly practising to the north and east of the city. This reflects the pattern of MEH referrals (MEH, 1993a).

The large number of 'information only' letters from OOs than referrals. This indicated that

GPs are being informed about the ocular health of their patients. The high number of these letters may simply reflect the tight constraints of the GOC (rules relating to injury or diseases of the eye) Order of Council, 1960 which were made under s.31(5) of the Opticians Act 1989 (see p.5). The College of Optometrists Guidelines (COptom, 1991) advise the optometrist to keep the GP informed if a condition observed is not felt to require further medical investigation.

GPs are aware of the GOS18 form. However, most prefer to use their own referral letter/form in preference to completing the allocated areas on the GOS18. Jones et al (1990) found a much larger use of the GOS18 by GPs who filled in the allotted section in 51.8% (132) referrals. Completing additional referral correspondence involves the GP in more time and effort with many patients' details having to be repeated. Stylised referral forms are frequently advised (Jones et al, 1990; Kentish et al, 1987; Addley and Duffy, 1982). The GOS18 form seems ideal for ophthalmic referral (Curran, 1992) but clearly personal preference is a factor. Producing a referral form that satisfies all practitioners from several professions is obviously difficult.

Following criticism by a GP that referral of a patient from the OO to the HES was just an 'administration task' (Claoué, 1993) a question along these lines was included in the questionnaire to assess whether this was a widely held view. The results indicated that it was, and this may be part of the reason that GPs were positive towards direct referrals.

The Health and Medicines Act 1989 resulted in the abolition of the universally available NHS eye examinations. Over half the population now have to pay for an eye examination (FODO, 1995). The antipathy towards the examination charges was obvious. Whether this is a general disagreement against the erosion of the original NHS principal of services being free at the point of need, or due to the more specific problems of dealing with patients who refuse, or are unable, to pay for eye examinations, was not explored.

The eye examination charges have produced changes in the referral decisions of GPs. Half the GPs admitted that they have referred patients to the HES whom they would previously have referred to a local optometrist. This change in referral patterns was observed in a survey conducted in Barnet Health Authority looking at 191 new ophthalmic outpatients (Henderson et al 1990). The large increase in the percentage of elderly patients was thought to reflect a possible change in practise by GPs who were referring to hospital services. This present study adds weight to Henderson et al's (1990) assumptions. When the savings associated with the abolition of the universal NHS eye examination are evaluated, these factors must be considered.

Laidlow et al (1994) analysed glaucoma referrals to the Bristol Eye Hospital. They identified a decline in the referrals following examination charges. Predictions made in the study using an extrapolated regression line were unsound and largely criticised (Gardner, 1994; Kirkby, 1994; Phillips, 1994; Pooley et al, 1994).

GPs responded positively when asked about OO referrals. Comments in the medical press such as those by Smith (1988) which stated that the "sight test" has nothing to do with disease, does not help to promote the standing of optometry within primary health care. Strong links between the medical and optometric professions are important if patients are to be dealt with in the most effective manner. Relationships between GPs and OOs are often established on a local basis and can be aided by the local ophthalmic consultant (Crick, 1989).

GPs felt that patients were often responsible for causing referral delays. Patients frequently do not understand or will misinterpret much of the information that they are told (Ley, 1988). Therefore the instructions given to them by the Ophthalmic Practitioners may not have been acted upon. Ley (1988) gave two possible explanations for this:

- The clinician often presents the information in too difficult a form for the patient to understand.
- The patient had often got theories about the condition and interprets the new information in the framework of their existing ideas.

The optometrist is obviously able to provide health education to patients during the eye examination. The importance of explaining to the patient clearly and simply is obviously very important. The patient is frequently not expecting to be referred and generally assumes that poor sight means new spectacles. The patient needs to act in order that an appointment with the GP is made and referral to the HES if required is made. One of the many changes brought about by the recent NHS reforms has been a limit on patient waiting times for appointments and treatment (DOH, 1995). By delaying initial attendance, prior to hospital referral, the patient slows the whole referral system and irretrievable damage may be caused to the eyes due to this delay eg. glaucoma.

The Optometrist may also be at fault. Professionals may not comply with what is expected (Ley, 1988) and may not be giving the correct instructions to their patient. This was felt to be the reason for delay by only 4 GPs.

The GP is central to the NHS structure. Referrals to secondary medical care are usually made via the patient's GP and it is his/her function to act as a 'gatekeeper' to the hospital

service. The optometrist, after 3 years undergraduate education and 1 year pre-registration professional training has a greater knowledge of ocular disorders. Many GPs in this survey admit to feeling unable to prevent HES referral for OO initiated referrals and this displays a true weakness in the system. This contradicts a study conducted by Perkins (1990) where the conclusions reached were that GPs, "continue to be an effective filter in the referral pathway". The study, based on his ophthalmic referral practice alone, appears not to be representative of GP practice.

Pressure from the patient may also be an important factor (Armstrong et al, 1991). If the optometrist has already told the patient that they will need to be seen at the hospital, the patient may not accept advice from their GP.

The role of the GP in the OO/GP/HES referral process is therefore brought into question. If the majority of GPs feel that they cannot prevent onward referral, then direct referral may be an option. GPs in this study felt it was an option. Boggon (1992) found that most optometrists wanted to refer patients directly to the HES and 96.8% of the GPs in this study felt that at least in selected circumstances, direct referral would be beneficial to the patient. A similar response was made by local GPs in a study conducted in Scotland (Howie and Taylor, 1982). The fact that direct referral would reduce unnecessary delays within the two tier referral process was felt to be an important factor in the direct referral process (Kljakovic et al, 1985).

The question in this study was carefully worded and specified "financial constraints aside". The NHS and Community Care Act 1991 resulted in the creation of the internal market. District health authorities and fund holding GPs contract hospitals to provide services. Direct OO referral to the HES would not be straight forward. Carefully monitored and local agreements appear to be the only feasible mechanisms for such a scheme. The GP would need to be informed and the Opticians Act, 1989 reviewed. Whatever the difficulties the fact remains that those GPs who answered the questionnaire felt that patients would benefit.

"Communications between the general practitioner and optometrist tends to be one sided: from the optometrist to the general practitioner" (Boggon, 1992) and OOs are frequently complaining about the lack of feedback that they receive from referrals. The optometric profession has put much effort in recent years into continuing education and training but without referral feedback the OO is unable to gauge the accuracy of his/her referrals. The frequent argument about breaches of patient confidentiality if OOs are informed of the referral outcome are overcome if patients sign the new GOS 18. Referral feedback should

add to the relationship between the ophthalmologists and the optometric profession ensuring that both professions will benefit.

One important addition to the GOC Terms of Service brought about by the Health and Medicines Act, 1988 was the requirement that a written report should be sent to the patient's GP if that patient suffered from diabetes or glaucoma. All the GPs in this study found this information useful. A report following every eye examination increases the amount of paperwork that the GP has to scrutinise, but he/she knows that the fundus is being regularly examined. It is of concern that one practitioner claimed never to have received diabetic/glaucoma reports and raises the question of whether all OOs and OMPS are aware of this legal requirement

Feedback of information has been found to be an important part of the maintenance of high quality clinical care (Mugford et al, 1991) and it is the hospital's responsibility to maintain strong links with the GPs (Lachman and Stander, 1991). Good communication between the hospital and GPs can also enable some patients to be managed by their GP without the need for further referral (Jones Elwyn and Scott, 1994). GPs were generally satisfied with the correspondence that they receive from MEH but more detail is required. It would be possible to incorporate a more detailed standard explanation of a condition within the letter.

Many referral letters ask questions which are not always answered in the hospital's reply (Tudor Hart, 1989). Treasure (1989) felt that hospital replies must have a personal touch. GPs in this study felt this was missing. With the continued increase in the number of referrals to the HES each year (Laidlow et al, 1994) and the need to maintain good communication with GPs, it becomes more difficult to make letters personal. The factual information is obviously the important element.

This research highlights the need to implement fundamental changes to the present referral process. Speed of referral will be helped enormously if new technological advances in communication networks (superhighways) become established. Replies will be with the GPs before the patient has even left the department.

6. WHY DO NEW OPHTHALMIC PATIENTS FAIL TO ATTEND?

6.1. Introduction

If a patient fails to attend a scheduled appointment, the referral system may be seen to have failed. Patients who may be suffering from sight threatening diseases are being put, or are putting themselves, at risk. NHS resources are also wasted with many health care costs being fixed eg. salaries, heating, administration etc.

The number of patients who fail to attend medical appointments varies considerably. Previous studies have shown values ranging from 6.5% (Hagerman, 1978) to 41% (French et al, 1982). Few studies have been conducted of patients who fail to attend (DNA) NHS appointments and most of the published studies are based in the United States. However, the independent health system and differing culture of the American people will obviously limit comparisons with the UK health service.

Numerous reasons for failing to attend have been put forward. These include: illness (Bigby et al, 1984; Potamitis et al, 1994; Shah et al, 1977; Verbov, 1992; Walsh et al, 1967), forgot appointment (Potamitis et al, 1994; Shah et al, 1977; Verbov, 1992; Walsh et al, 1967), away/busy on appointment date (Bigby et al, 1984; Carpenter et al, 1981; French et al, 1982; Shah et al, 1977; Verbov, 1992; Walsh et al, 1967), did not receive appointment (Potamitis et al, 1994; Shah et al, 1977; Verbov, 1992) and an improvement of condition (Carpenter et al, 1981; Potamitis et al, 1994; Robin, 1976).

The number of DNA studies concentrating on NHS ophthalmic patients is small (King et al, 1995; Potamitis et al, 1994). In Birmingham, Potamitis et al (1994) identified various reasons for non-attendances of ophthalmic patients. The main reasons included illness, forgotten appointments, an improvement in the condition and the fact that the patient claimed to have already cancelled the appointment. King et al (1995) in Liverpool looked at factors affecting non-attendance. Patients were more likely not to attend if their appointment was in the afternoon and if they were review rather than new patients.

No research has been conducted to identify whether patients whose referral is initiated by an OO or OMP is more or less likely to attend than those referred only by their GP. The fear being, that having consulted both their ophthalmic practitioner and their GP, the patient may not be bothered to consult further. Alternatively, that having consulted both professionals the patient is more concerned about the ocular condition and so is more likely to attend. A further factor may be that as the OO/OMP generally takes longer examining the eyes than the GP, and is considered more specialised in eye care, then the

patients referred by their OO/OMP would be more likely to attend an HES appointment.

6.2. Aims and Hypotheses

The study aimed to identify whether the likelihood of a new ophthalmic patient failing to attend for an appointment was linked to the referral route. Other factors affecting the DNA rate of new patients were explored.

The study set out to test the hypothesis that there is no statistically significant difference between the referral initiator of those patients who attended for their new ophthalmology appointment at MEH compared with those patients who failed to attend.

In addition the following hypotheses, stated in their null form were tested:

- There is no statistically significant difference between the gender of those patients who attended compared with those patients who failed to attend.
- There is no statistically significant difference in the likelihood of attendance between patients who needed to be accompanied to their appointment and those who could attend alone.
- There is no statistically significant difference in the likelihood of attendance between patients who are aware of the reason for referral and those who are not aware of the reason.
- There is no statistically significant difference in the likelihood of attendance between patients in paid employment and those who are not.
- There is no statistically significant difference in the likelihood of attendance between patients who are willing to attend MEH again in the future if required and those who are not.
- There is no statistically significant difference in the likelihood of attendance between patients who require an interpreter and those that do not.
- There is no statistically significant difference between the martial status of those patients who attended compared with those patients who failed to attend.
- There is no statistically significant difference in the likelihood of attendance between patients who specifically requested to be referred to MEH than those that did not.
- There is no statistically significant difference in the likelihood of attendance between patients suffering from symptoms and those that are not.
- There is no statistically significant difference between the ages of those patients who attended compared with those patients who failed to attend.

- There is no statistically significant difference between the amount of notice of the appointment of those patients who attended their first ophthalmology appointment at MEH compared with those patients who failed to attend.

It should be noted that all hypotheses refer to patients attending or not attending their first ophthalmology appointment at PCC or CEB.

The study also aimed to identify a statistical model for predicting whether or not a patient would attend or fail to attend their appointment. Thus the hypothesis that it is possible to predict from the statistical model whether a patient will attend for their first ophthalmic outpatients appointment at MEH was tested.

It is important in a study of this design that the population of non-responders is compared with the population who responded to the questionnaire. Therefore the null hypothesis that the characteristics of the non-responder population does not differ significantly from the population of responders was tested.

6.3. Pilot Study to establish data collection techniques

Introduction

The underlying assumption in this study was that if patients do not attend for an appointment, then they would be unlikely to complete a questionnaire.

Table 6.1. A Summary of Data From Previous DNA studies

Authors	type hosp/clinic	Year*	% response	N	Te**
Alpert	Children OPD	1964	49%	179	T
Go and Becker	Primary care	1979	37.5%	94	T
French et al	breast screening	1982	49%	54	P
Frankel et al	General Hosp. OPD	1989	58%	162	P
Lloyd et al	ENT(I) gastroenterology (ii)	1993	I) 42% ii) 43%	I) 107 ii) 43	P
Potamitis et al	Ophthalmology	1994	43%	224	P

*** as the date the study was conducted is not always recorded, the year of study publication is recorded.**

**** Te - technique used:**

T - telephone interview

P - postal questionnaire

I - personal interview

N=number of respondents and not total number of subjects

Previous studies have failed to obtain a large response rate (Table 6.1). Bigby et al (1984) produced a response rate of 73% in their study but waited for a majority of their patients to reattend the primary care clinic. This was similar to Verbov's study (1992) which instead of simply looking at non-attenders, looked at non-attenders who attended at a later date. Unless patients are available to answer questions the chances of obtaining a large response rate appear low.

Aims and Hypotheses

This pilot study endeavoured to establish the optimal technique for collecting data from new ophthalmic patients who failed to attend appointments at the Primary Care Clinics of MEH Eye Hospital. Analysis of responses to interviews and questionnaires was not the main area of this study, but patient replies were examined in order to develop questionnaires and questioning itineraries.

The study tested the following hypotheses stated in their null form:

- The data collection technique used has no affect on the response rate.
- There is no statistically significant difference between the response rates to the questionnaire of those patients who were guaranteed anonymity compared with those who were not.
- There was no statistically significant difference in the response to the question asking patients about the reason for not attending from those who were interviewed compared with questionnaires answers.

Method

The retrospective study was conducted in the PCC 2-4 weeks after the allotted appointment. Patients failing to attend from 1 November 1993 onwards were selected. Two data collection techniques were used: telephone interviews and postal questionnaires sent to patients. Only patients who had no outstanding hospital classification number were selected for inclusion in the study. The first 40 new patients who failed to attend formed the sample population for the questionnaire trial. These patients were divided equally by random sampling. Half of this sample was assured anonymity, while the other questionnaires were numbered to identify patients. The latter group were sent reminders if replies were not returned.

Once 40 patients for the questionnaire sample had been selected, subsequent patients were assigned to a telephone interview technique. Subjects were only included if the British

Telecom directory enquiries service was able to provide a telephone number.

Questionnaires and Interviews

Two questionnaire formats were used; one was designed for adult use, while the second was adapted to allow a parent to fill in the questionnaire on the behalf of their child (Appendix XV). A child was classified as a person under the age of 17 years. Care was taken to keep the document brief and an open question style was used. A covering letter was sent with each questionnaire explaining the purpose of the survey and advice regarding confidentiality.

All questionnaires were sent with stamped addressed envelopes for the patients to return the completed document. Categories were as follows:

I. *Anonymity* - 20 patients selected at random were assured of anonymity. This precluded reminders being sent.

II. *Numbered questionnaires* - A further 20 patients were selected in the same way as with group a). The questionnaires were numbered to identify the patient. The receipt of a questionnaire was noted and reminders were sent;

i. 11 days later to patients who failed to return questionnaires.

ii. 25 days later a further questionnaire was sent with another stamped addressed envelope.

III. *Telephone Interviews* - The 20 patients in this category were asked identical questions to those subjects in the questionnaire sample. A maximum of 5 attempts were made to interview the subject. Phone calls were made at varying times of the day and evening. A weekend call was made if the subject could not be reached at other times. All the interviews were conducted by the author.

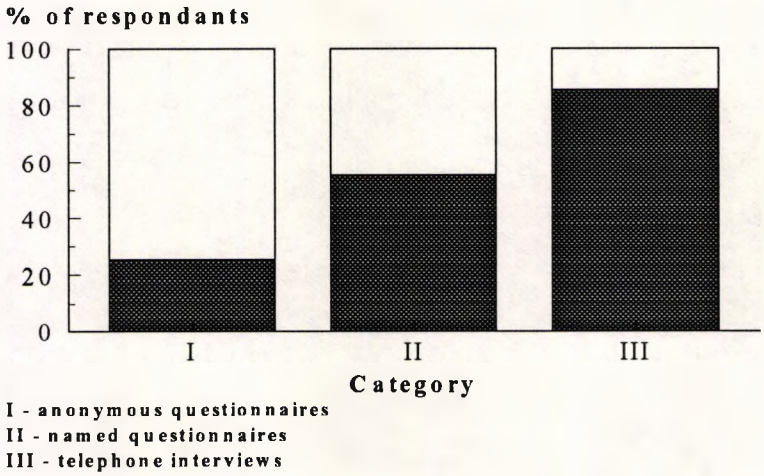
Results

10 patients responded to the questionnaires in category II and 9 questionnaires were returned from category I (Figure 6.1). The patients in category II received 2 reminders if the questionnaire had not been returned. 6 questionnaires were received initially, a further 3 after the first reminder and 1 more after the second.

Of those questionnaires received in category I, 1 patient had simply written the reason for not attending on a separate piece of paper and failed to complete the questionnaire. This subject was not included in any analysis. A further questionnaire was returned by the post office as "unknown at this address".

The telephone interview group III was selected from a group of 40 patients. 14 of these patients were not listed by British Telecom as having telephones at the given address and

Figure 6.1. Replies to Different Data Collection Techniques



6 patients were ex-directory. These 20 patients (50%) were eliminated from the study. 20 further patients met the criteria and were included in the study. Of this sample 3 could not be contacted; 2 telephone numbers produced no reply after 5 attempts at varying times and dates, and another patient was not known at the house telephoned though the telephone number was confirmed as correct by the householder. This resulted in a response rate for this technique of 85% (17). This was a significantly greater than the response rate obtained by the questionnaires (χ^2, df=1, p=0.01) and therefore the study rejects the null hypothesis that the data collection technique used does not affect the response rate.

Using χ^2 with Yates correction (χ^2, df=1, p=0.10) there was found to be no statistically significant difference between the number of replies received from the anonymous and named questionnaires and the null hypothesis is accepted.

No notification of the appointment was received more than 1 month before the date the patient was due to be seen.

Various reasons were given for failing to attend for the appointment (Table 6.2) and all but one patient stated that they would attend MEH in future.

To compare the responses from questionnaires and interview techniques, reasons for failing to attend were divided into two categories (Table 6.3):

1. the patient was unaware of the appointment or had cancelled the appointment.
2. the patient was aware of the appointment but had not attended.

There was no significant difference between the category of response between the two questioning techniques (χ^2, df=1, p=0.80) and therefore we accepted the null hypothesis stated previously (see 6.2).

Table 6.2. Reasons Why Patients Fail to Attend for their Appointments

Reason for DNA	Replies
Already Cancelled	3
Ill	3
Appointment not received	11
Condition better	3
Holiday	4
Family Problems	1
Inconvenient	7
Patient muddled over appointment	1
Transport Problems	1
Forgot	1
Examination elsewhere	1
Total	36

Table 6.3. Comparing Reason for DNA with Data Collection Technique

Category	1	2
Telephone	7	10
Questionnaire	7	11

Not all the respondents completed all the questions on the questionnaire though no-one refused to answer any questions in the telephone interviews. 3 patients had failed to turn the questionnaire over and 4 had not replied to the initial question about the date on which they received the appointment. 1 patient failed to explain the reason for referral by their GP, despite answering that they were aware of the reason. 32 of the patients were aware of the reason for referral.

11 patients were not in paid employment. Of those that were, equal numbers of patients fell within the groups II,III and IV of the socio-economic classification (OPCS,1993). 36% of patients claimed that they had specifically requested to be referred to MEH. 18% of patients stated that they were unaware of an eye problem prior to the referral. 3 of these patients were referred by an optometrist and 3 by a GP.

The source of referral was not known for patients in category I. In category II and III, 11 referrals were initiated by an OO, 17 by a GP and 1 came from another source. These proportions do not vary significantly from those usually received in the primary care clinic (χ^2, df=2, p=0.05).

Discussion and Conclusions

Telephone interviews produced the highest response rate and the null hypothesis that there was no difference in the response rates between the data collection techniques was rejected. The technique also had the advantage that the subjects answered all the questions compared with several questions that were missed in the other trials. From a subjective point of view the patients interviewed were very positive towards the questioning and many thanked the interviewer for calling.

The disadvantage of the telephone interview technique was its lack of penetration into the target sample. 50% of those meeting the criteria for this study were rejected due to the fact that they could not be contacted by telephone. Only one of the postal questionnaires was known not to have reached the patient where 100% of the subjects were used in the study.

The acceptance of the null hypothesis that there was no statistically significant difference between the response rate for those patients who were given anonymity for the questionnaires compared with patients who were not, was interesting. There are considerable advantages to being able to identify the patient who responded to the questionnaire eg. their responses can be linked with there referee, and reminders can be sent if the patient has not responded.

It was felt that telephone interviews may elicit more truthful responses to the reason for failing to attend question. This was because patients have more time to consider their response to a questionnaire. However, the null hypothesis was accepted (there was no difference) and although this was only a crude comparison between the two data collection techniques, it does give greater confidence when comparing the two data collection techniques. The use of a combined telephone and questionnaire data collection

exercise therefore appears feasible.

3 of the patients could have attended if there was a longer interval between appointments being sent out and the appointment date. It is unknown why 10 patients claimed that they had not received the appointment. The Royal Mail were unable to provide any data to indicate the amount of unregistered post which goes astray (Rose, 1995). Obviously the questionnaire had been received without difficulty or the telephone number was obtained from British Telecom with the address on the computer records. 9 of the patients had other commitments on the day of the appointment though failed to inform the hospital. Cancelling the appointment could have allowed for urgent cases to have been seen.

The ocular condition was improved in 3 cases. It would appear that referral was unnecessary in the first place.

Due to the small number of patients used in this pilot study, no conclusions can be drawn regarding the number of patients failing to attend. However, the study has shown that using the telephone interview technique is very successful in achieving a high response rate to questioning of patients about failing to attend.

6.4. Identifying the Reasons for Failing to Attend

Method

The study was conducted within the PCC and CEB. Patients who attend CEB are selected from the whole population of MEH referrals from their addresses alone and the clinic runs along identical protocols to the main hospital clinic.

A new patient under this study is a patient who has no previous hospital number ie. has not attended the hospital before or not for at least 10 years. 'New patient' classification under the hospital protocols indicates a patient who is attending for a new assessment and not necessarily new to the hospital ie. new patients may have been referred from the AED or have been seen and discharged from the PCC a few months before and have been re-referred by their doctor.

The data was collected over a seven week period from 14th March, 1994 until 29 April, 1994. The study period covered two Bank Holidays (Good Friday and Easter Monday) and therefore included 33 days (66 clinics) for the PCC. The CEB clinic is run only on a Monday, Wednesday and Friday and therefore the study period covers 19 days (38 clinics). However, on studying the patient attendance records the DNA rate among new patients appeared much greater at this clinic. Over the 2 weeks preceding the study 28.2% (42/149) of the new patients failed to attended compared with only 9.82%

(22/224) of the PCC patients. The greater number of DNA patients would increase the sample size to ensure that the target number of respondents was easily reached.

Control patients were new patients selected by random sampling from the population of new patient attenders. They matched the DNA patients in having appointments at the same clinic ie. if 3 new patients failed to attend a Friday morning clinic, 3 new patients who had attended that clinic were randomly selected as controls.

Two questioning techniques were used; telephone interviews and questionnaires. Where possible telephone interviews were conducted. Patient records were inspected for telephone numbers and where the information was not available, British Telecom Directory Enquiries was contacted. Five separate attempts were made to contact patients by telephone. Calls were made at varying times of the day. One call was made in the morning, two in the afternoon, one in the evening, and patients were contacted on a Saturday morning if unobtainable at other times. Patients who could not be contacted after 5 attempts by telephone, and those who had no listed telephone number, were sent a questionnaire. Two reminders were sent if necessary. One reminder followed after between 2 and 4 weeks, and the other between 6 and 8 weeks later. Attempts to contact a patient were made between 2 and 4 weeks after the allotted clinic appointment. A questionnaire for control and DNA patients was produced and then restructured to allow a parent or guardian to complete the questionnaire on behalf of their child. In this study a child was considered anyone 17 years or under. The DNA questionnaire often covered details which were also available from the referees letter. These were included in the questionnaire as some vital information eg date of birth, are occasionally missing.

The telephone interview followed a very similar pattern to the questionnaire. Where information was already available about the patient eg date of birth, the questions were excluded from the interview. The interview length varied as patients frequently asked questions themselves. All patients were asked initially whether they had any objections to answering the questions and were advised that the questions were part of a hospital research study. All the interviews were conducted by the author.

The data was collected onto a data base and analysis was computed by SPSS™, a statistical package for the Social Sciences.

Results

Over the study period 14 March 1994 - 29 April 1994 new patient attendances were recorded (Table 6. 4).

Table 6.4. Clinic attendances and non-attendances

Clinic	Attendance	No. Pts	% DNA
PCC	Attended	511	
	DNA	57	11
CEB	Attended	431	
	DNA	84	19

The overall DNA rate was 15%.

The DNA rate was calculated to be 11% at PCC and 19% for the CEB clinic for all new patients. On inspection it was seen that one patient had failed to attend on two separate episodes at the PCC while three patients had failed twice at CEB. This resulted in 56 and 81 DNA patients respectively being included in the study and an equal number of controls. 51.8% of DNA patients were initially contacted by telephone, compared with 87.6% of control patients (Figure 6.2). The likelihood of receiving a response from DNA patients if telephoned was very low (Table 6.5). Only 35.2% of patients who had failed to attend were contacted by telephone after 5 attempts and one of these patients refused to answer the questions. In comparison, 70% of patients in the control category were contacted by

Table 6.5. Contact Techniques and Responses

Type	Initial	Final	N	response	rate
DNA	Phone	Phone	25	24	
	Phone	Post	46	16	56.3%
	Post	Post	66	28	42.4%
Totals			137	68	49.6%
Control	Phone	Phone	80	78	
	Phone	Post	40	21	82.5%
	Post	Post	17	11	64.7%
Totals			137	110	80.3%

telephone. No patient in the control group refused to answer the telephone interviewer's questions although two patients had died since their appointments.

Details available for non-response subjects were obtained from hospital records. These were provided either by the referee or by the patient themselves if they have subsequently attended or returned an information form which is sent out to all patients prior to their scheduled clinic appointment.

Comparing responders and non-response individuals

Non-responders form a large group especially for the DNA sample. Age, sex and area of residence were known for non-responders and analysis was performed. Although the decision to refer patients to CEB compared to PCC is decided by the patient's address alone, this variable was also compared in order to assess whether there was any difference in responses from each clinic (Table 6.6). The response rate for DNA patients is higher for patients booked to attend the PCC compared with CEB patients, but the difference is not significant (χ^2, df =1, p=0.5). The control sample response rate for both clinics was very high but once again there was no significant difference between the two clinics (χ^2, df=1, p=0.5).

Table 6.6. Response Rates

Clinic	Type	%response
CEB	DNA	48.1
	Control	81.5
PCC	DNA	69.6
	Control	78.6

Table 6.7. Comparing responders with non-response subjects

Variable	Test	Controls	DNAs
Age	Mann-Whitney U	Z=-3.236	
Sex	χ^2, df=1	2.139	0.166
Area Lived	χ^2, df=2	2.48	0.38

No significant difference was found between any of the known variables for the responding and non-responding groups (Table 6.7). The study therefore accepted the null hypothesis that the characteristics of the non-responder population does not differ significantly from the population of responders.

Reasons for Failing to Attend

The reason for failing to attend was asked as an open style question towards the middle of the questionnaire (Figure 6.3). The main reason given was that the patients claimed they had already cancelled the appointment. Several patients appeared to have contacted the hospital on a number of occasions in order to obtain another appointment without success.

11 patients had not received details of their scheduled appointment. It was ascertained in all 4 of these cases in the telephone interview that the address which was recorded by the hospital was not correct. The GP had given an incorrect address as recorded in the referral letter for 3 of these patients. 7 of the postal questionnaires were returned with the reason for not attending being that they had not received their appointment card, but obviously the postal questionnaire had been received.

To compare the responses from questionnaires and interview techniques, reasons for failing to attend were divided into two categories in the same way as the pilot study (Table 6.8):

I) the patient was unaware of the appointment or had cancelled the appointment.

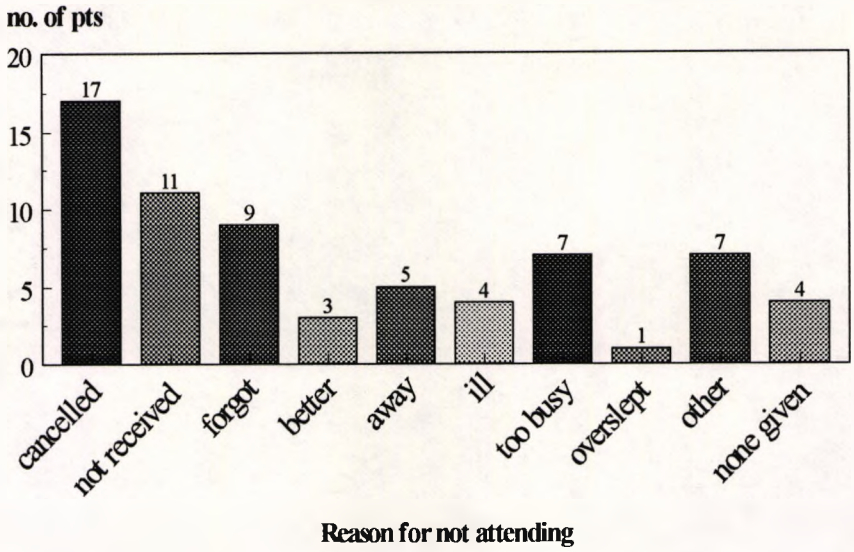
II) the patient was aware of the appointment but had not attended

There is no significant difference between the category of response between the two questioning techniques (χ^2, df=1, p=0.90).

Table 6.8. Reasons for failing to attend compared with data collection technique

Category	I	II
Telephone	18	26
Questionnaire	10	14

Figure 6.3. Reason for Failing to Attend



Comparing controls and DNA patients

Chi square analyses and Mann-Whitney U tests were conducted to identify differences between the DNA and control sample populations (Figures 6.4-6.7, Table 6.9). From the results identified in Table 6.9. it can be seen that this study rejects the following null hypotheses:

- There is no statistically significant difference in the likelihood of attendance between patients suffering from symptoms and those that are not.
- There is no statistically significant difference between the ages of those patients who attended compared with those patients who failed to attend.
- There is no statistically significant difference in the likelihood of attendance between patients in paid employment and those who are not.

For these variables the alternative hypothesis ie. there is a statistically significant difference, was accepted. In summary, the study has identified that DNA patients are more likely to be in employment, they are less likely to be suffering from symptoms and they are statistically younger than patients who attend.

Discriminant Analysis

A discriminant analysis was also conducted to compare the characteristics of attenders and non-attenders. Using the known characteristics, a prediction could then be made on the chances that a new patient will fail to attend for their future appointment. Two different analyses were conducted. Initially variables available for all patients were included ie.

Figure 6.5. Responses to Interview/questionniare

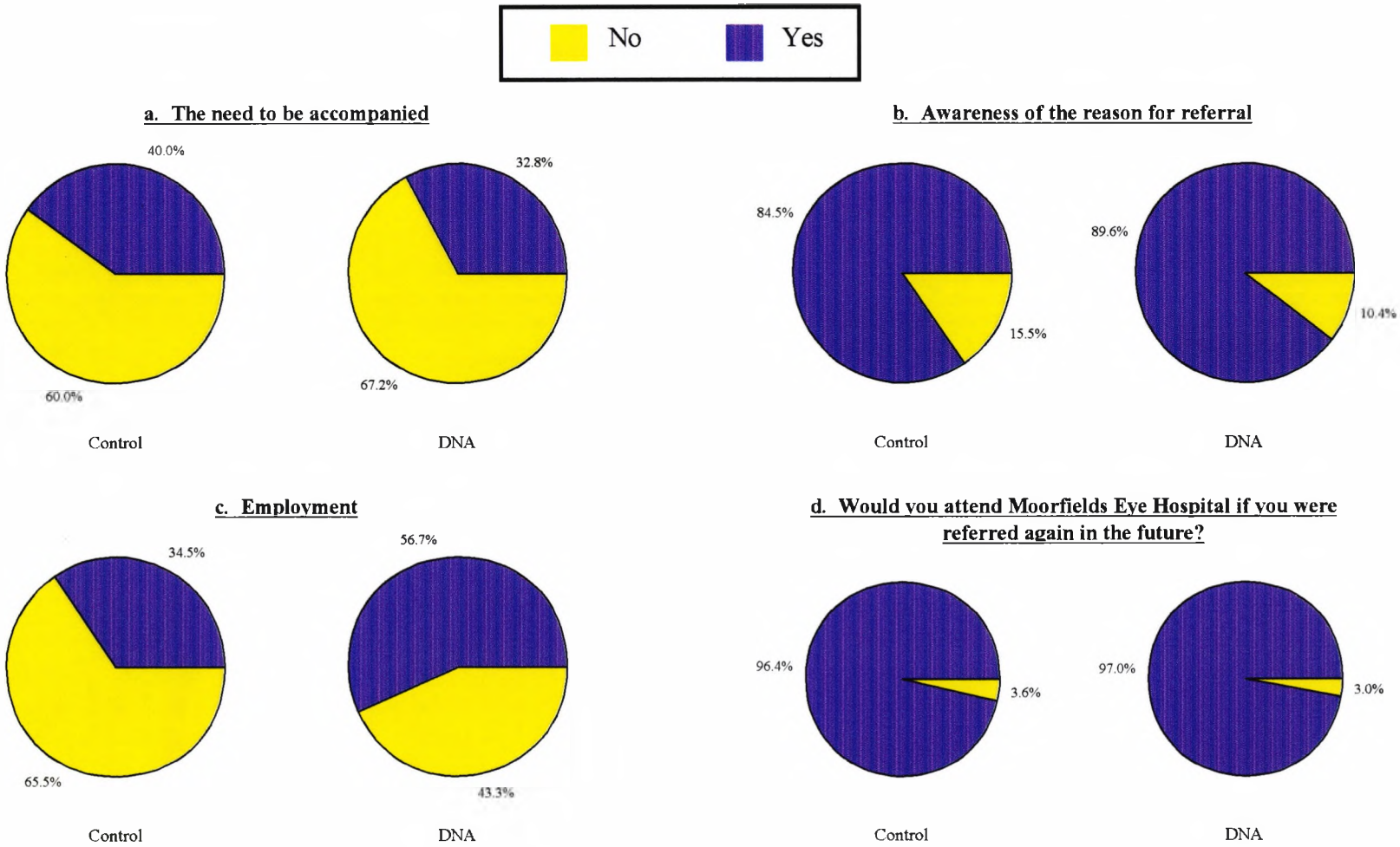


Figure 6.5. Responses to Interview/questionniare

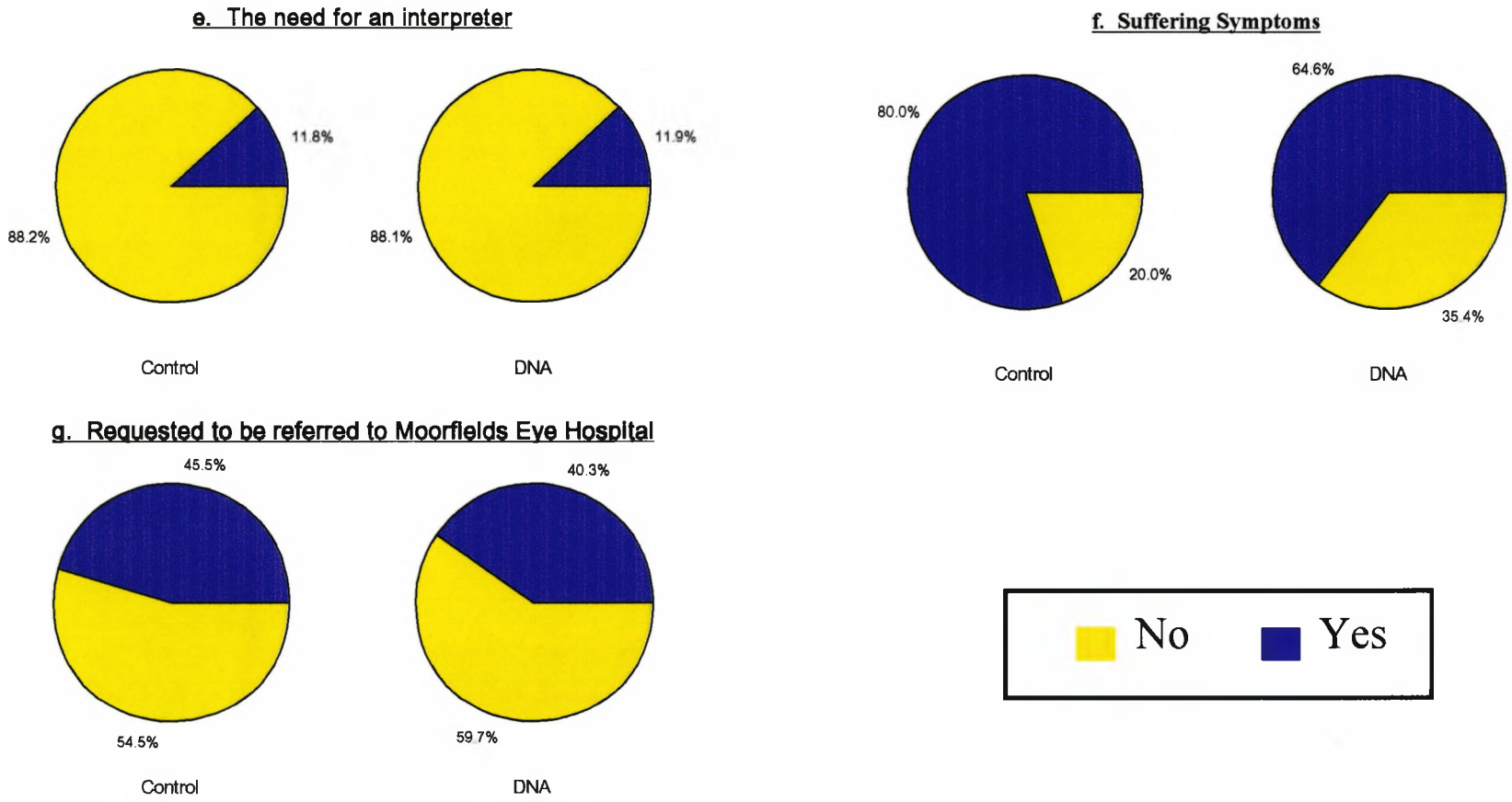


Figure 6.6 Sample Population Characteristics

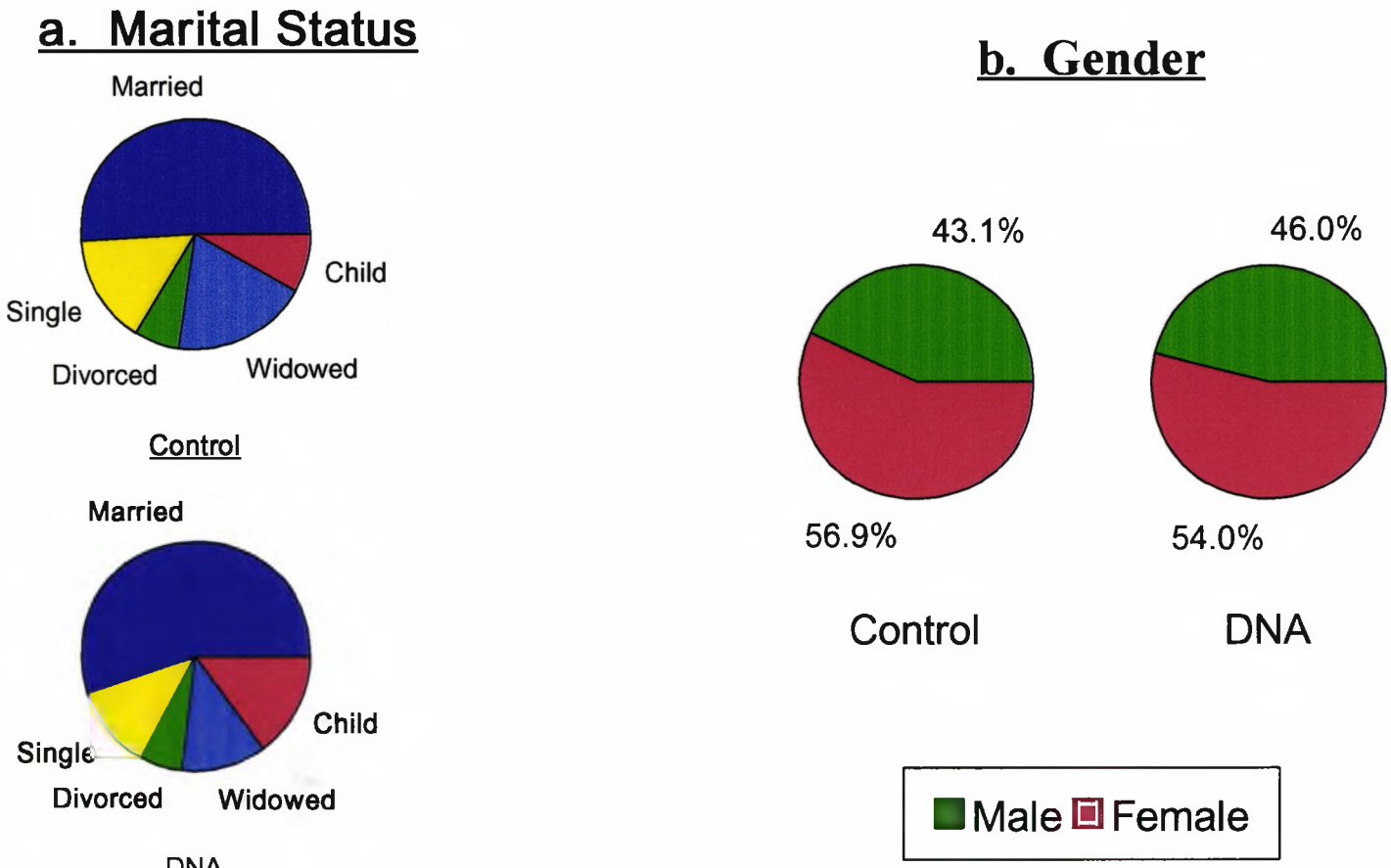


Table 6.9. Comparing Attenders with Non-attenders - Testing Hypotheses

Variables	χ^2	H_o
Gender ♦	0.236	accept
Referee (GP, Other)□	0.751	accept
needed to be accompanied to appointment□	0.914	accept
aware of reason for referral□	0.891	accept
in employment□	8.354**	reject
attendance in future□	0.539	accept
required interpreter□	0.001	accept
marital status□	3.585	accept
requested MEH□	0.450	accept
suffering from symptoms□	5.062*	reject
Variable	Mann-Whitney U	
Age♦	z=-3.2368**	reject
Appointment delay□	z=-1.7562	accept

* p = <0.05 ♦ = all patients

** p = <0.01 □ = respondents only

gender, referee and age. Secondly the additional variables provided by the questionnaire responses were added to assess whether these additional factors would improve the model. A stepwise approach was used in the model, with the variable which minimises Wilks' lambda being introduced first (Appendix XV).

The best predictive accuracy was 64.41%, using only the information provided from the referral correspondence ie age, gender and referral initiator. With an average DNA rate of 15%, an accuracy of 85% was obtained using the constant predictor technique ie. it is predicted that all the patients will attend. This was therefore a better predictor than the statistical model. The hypothesis that one could predict from the statistical model whether or not a patient will fail to attend for their first ophthalmic OPD appointment is therefore rejected.

6.5. Discussion

Collection of DNA data has previously been conducted in various ways. Verbov (1992) interviewed 100 patients who had missed dermatology appointments and subsequently reattended. This has the obvious disadvantage of choosing a select group of DNA patients ie those that reattend. Questionnaires were sent to patients who had failed to attend various outpatient clinics in a study by Frankel et al (1989) resulting in a 58% response rate by DNA's and comparing these patients with a control group of attending patients. Telephone interviews were conducted in two American studies (Alpert, 1964; Carpenter et al, 1981) but both studies failed to obtain a sufficient recruitment of DNA patients. However, the results vary considerably between the studies and the different techniques resulted in differing degrees of response.

By conducting a detailed pilot study it was hoped that a response rate for DNA patients of greater than 70% could be achieved by combining the two data collection techniques. This would have been much greater than other published studies. An overall response rate of just over half was therefore disappointing. This was however comparable with other DNA studies (Table 6.1).

Findings in the pilot study revealed that anonymity does not increase the likelihood of a patient responding to this type of study. It was not felt that lack of anonymity was a factor in the high non-response rate despite the attempts by other workers to respect this (Potamitis et al, 1994). The advantage of naming responders also allowed a comparison with the non-response group which was essential because the latter group was large. No significant difference was found between the age, sex or home location of the two populations. Further, despite a large DNA rate at the Bow clinic, there was no statistically significant difference in the number of responders and non-responders from each clinic. By accepting the null hypothesis that there was no difference between characteristics of the responding and non-response population more confidence in the collected results can be allowed.

The coverage of the telephone interview was very similar to the pilot study, telephone numbers were not available for 51.8% of DNA patients. However, one of the main differences between the pilot and main study was the difficulty in contacting the patient. 46 DNA patients (64.8%) could not be contacted by telephone after 5 separate attempts at different times of the day and on different days of the week. The study was conducted in late March and April which covered the Easter period. Patients may have been away on holiday during this period. There was only one DNA patient who refused to answer

the telephone interview questions.

Control patients were much more likely to be included in the telephone interview data. Patients could be contacted by telephone with greater ease because telephone numbers were more easily available (they are often recorded in the patient hospital records). It is significant that of all the patients included in the telephone interview, the control patients were much more likely to be interviewed. DNA patients, where telephone numbers were available, were less likely to be contactable by telephone. They appear to lead a lifestyle which takes them away from home more often. Busier people would be expected to find it more difficult to attend for a hospital appointment.

Response rates to the postal questionnaire were also lower than in the pilot study. This may have been associated with the slightly longer time interval between posting the questionnaire to the patient and posting the reminders.

Comparison of the DNA rate with other studies

The overall DNA rate for this study was 15%, which included 11% at the main hospital and 19% at the community based clinic. All patients in the study were new patients. Potamitis et al (1994) studied DNA rates at BMEH. They identified a figure of 17.6% for new patients. However, the overall rate for old and new patients was lower at 9.9%. St Pauls Eye Hospital, Liverpool identified that new ophthalmic patients were slightly more likely to attend. DNA rates of 11.9% and 12.8% for new and old patients were calculated respectively. An ENT study in Bangor (Leese et al, 1986) also found that new patients were more likely to attend than review patients, but figures were higher; 22% was the DNA rate for returns and 14% for new patients.

More locally based clinics in Northern Ireland had better attendances than main regional centres. Dickey and Morrow (1991) showed that DNA rates of 23% in regional clinics compared with 9% at peripheral clinics. In conclusion they stated that medical specialities based at district general hospitals serving rural populations represent an efficient use of outpatient resources. Direct comparison with the MEH picture is obviously not straightforward, but from these patterns a more convenient local clinic such as CEB may have been expected to have a lower DNA rate. This was not found to be the case and may result from the complexity of transport infrastructures in the capital.

As has already been mentioned much of the work into DNA patterns has been conducted in North America. Primary medical centres have been shown to display higher DNA rates than in the MEH study. Bigby et al (1983) identified a rate of 24% in Boston, a similar

figure to the 27% found at a Santa Rosa clinic in California (Dervin, 1978) and 25.05% in a Los Angeles centre. A Pittsburgh clinic showed a higher rate of 38% for a similar service. Similar to the MEH PCC the Los Angeles clinic fills most DNA appointments with walk-in patients (88.56%) thus reducing much of the economic burden of unoccupied professional staff. An Ontario family physician identified a very low DNA rate of 6.05% (Hagermann, 1978). This is a marked contrast to the US studies and may illustrate a difference in patient attitude and health care funding between the two North American countries.

DNA rates in hospital based services vary enormously. A US psychiatry department identified a rate of 31.4% for new patients (Carpenter et al, 1981). This figure may relate to the nature of such medical conditions.

One may expect screening clinics to have high DNA rates. French et al (1982) found a 41% DNA rate in a breast screening clinic. However, Togerson et al (1993) calculated a much lower rate of 20% at a clinic screening for osteoporosis.

Studies in other medical specialities appear to display higher DNA rates than were seen at MEH. Shah et al (1977) calculated a rate of 25% in a Boston children hospital and Verbov's study of his dermatology clinic revealed a rate of 22% over an 8 month period (Verbov, 1992). In a London study at the Royal Free Hospital a 26% rate at an ENT clinic and 20% rate in gastroenterology were identified, whilst in Montreal a teaching hospital found a 20% DNA figure.

As has already been stated, care must be taken when comparing the DNA rates in these studies especially as many are based in North America. Also, many of the studies may well have been conducted because the hospital or clinic was concerned by their DNA rate. This would generally produce higher DNA rates than is the case across the whole health care sector.

Comparison of the Characteristics of DNA patients

The characteristics of the patients who failed to attend were analysed. Age was found to be an important factor, with younger patients being more unlikely to attend than older patients. Previous DNA studies illustrate many differences. Younger patients in some other studies have also been found to be more likely to fail to attend (Carpenter et al, 1981; Dickey and Morrow, 1991; Frankel et al, 1989; Go and Becker, 1979; Lloyd et al, 1993; Shonick and Klein, 1977) and no study found that the DNA rate was increased in older patients. However, age was not felt to be a significant factor by a number of other

researchers (Cawley and Stevens, 1987; French et al, 1982; Robin, 1976). At least one study expressed each opinion when a number of different medical specialities were investigated.

No significant difference was found between the DNA rates of males and females in this and some other reports (Frankel et al, 1989; French et al, 1982; Go and Becker, 1979; Jonas, 1971; Lloyd et al, 1993; Robin, 1976). Cawley and Stevens (1987) found that female patients failed to attend more frequently compared other studies who have found that it was men (Dickey and Morrow, 1991; Moxon, 1995). In both these latter studies the DNA rate was 23% ie. high (97/422 and 66/293 respectively). The setting was a regional hospital in both cases although Cawley and Stevens (1987) work was conducted in southern Ireland in general medical clinics compared with the Dickey and Morrow (1991) study in the north of the country in a neurology department.

Asymptomatic patients in this study were less likely to attend. Other studies, conducted in various areas of health care, showed that one of the main reasons why patients failed to attend their appointment was the belief that it was not worthwhile (Bigby et al 1984; Carpenter et al, 1981; French et al, 1982; Shah et al, 1977; Verbov, 1992; Walsh et al, 1967). Boston DNA patients were shown to be less ill and especially less likely to have chronic medical conditions requiring medication (Bigby et al, 1984). Gates and Colburn (1976) studied appointment failure in a US primary care setting. They showed that if patients feel that there is an urgency to their condition then they are more likely to attend. Certainly if the patient is not suffering symptoms they are likely to assess the condition as non-urgent or that there is nothing wrong and that the practitioner who referred them was being over zealous. These factors may be important in the attendance of patients with asymptomatic diseases eg. glaucoma, and there is a need for education by referee in order to stress the importance of having these conditions investigated. In a British study however it was felt that there was no medical difference in patients who attended and those that did not (Frankel et al, 1989).

It is often felt that lack of understanding by the patient may be a cause of "no show" (French at al, 1982; Shah et al, 1977). Glagow (1970) conducted a glaucoma screening programme. Patients requested for follow-up were subjected to patient education sessions which varied in length and content. However, health education was found to make no significant difference to the DNA rate. The attendance of these patients was however higher than for patients who were handed an appointment by the clerk. It was concluded that the "tender loving care" approach was more important than the patient education.

The study was conducted in the United States and it is believed that no similar study has been carried out in the UK.

The profession of the referee was not found to affect the likelihood of a patient attending. Due to the very few patients who were referred by practitioners other than their GP or OO/OMP, the categories were combined to form a GP and Other category. Lloyd et al (1993) analysed whether the GP affects the likelihood of attendance to an ENT clinic. However, there was found to be no relationship between the referral source and whether or not the patient attended.

Despite requesting patients to give details of their employment in a series of questions, the questionnaire replies were answered very poorly. The information was, in many cases, inadequate to identify correctly the socioeconomic classification. The problem was increased with a large number of retired patients who gave no details of their previous working practices. Hence, a more basic binomial classification was instigated producing a variable for whether or not the patient was in paid employment. This was felt important as an "ease of attendance" factor, on the assumption that it is often more difficult to have time off work to attend for an appointment. The alternative hypothesis was accepted for this variable, therefore patients who failed to attend were more likely to be in employment than those who attended their appointment. It is important that in this study the employment variable, as an ease of attendance factor, fails to identify people with dependants who, although not in paid employment, find it equally difficult to attend.

Patients belonging to the professional/managerial socioeconomic group were less likely to attend various medical clinics in the study by Cawley and Stevens (1987). Though women falling into this category were most likely to attend a breast screening clinic (French et al, 1982). Further, children whose families lived in the lower socioeconomic areas of Boston were less likely to attend outpatient clinic appointments (Alpert, 1964). French et al (1982) found that married women were significantly more likely to attend for breast screening. This conclusion was also reached by Frankel et al (1989). Once again the results of different studies vary. Cawley and Stevens (1987) showed that married patients, both male and female, were more likely than single people not to attend their OPD appointment. This MEH study showed no significant difference in attendance related to marital status.

Patients were asked if they required someone to accompany them to the appointment and if they required an interpreter. Neither variable was found to be significant in assessing whether or not a patient attended or failed to attend an appointment. However, it must

be considered that a patient who requires an interpreter would be unlikely to be able to fill in the questionnaire. Unless someone could help them, their results would not be collected. Jonas (1971) in an American study felt that the language barrier was an important factor in the DNA rate.

Reasons for not attending appointments

Reasons given by the patients as to why they failed to attend were numerous. It should be appreciated that patients may not always admit to the real reason or may well have forgotten. Interviews conducted by Carpenter et al (1981) in a psychiatry department questioned patients up to 17 months after their appointment and forgetting must be an important error in this study. Further, there is a lack of detail in many of the papers reviewed as to the exact questioning technique, and whether patients' responses remained anonymous. Potamitis et al (1994) were also concerned that despite assuring the patient anonymity, patients may not believe this and therefore be untruthful. The present study did not allow patients anonymity and the possibility that patients may have not been truthful is a possible source of error.

The results of interviews were compared with questionnaires. When patients are interviewed, they have less time to consider a response than in a questionnaire and it may be felt that this is a more accurate form of assessing reasons for not attending. Reasons for failing to attend were divided into those replies which could be considered the fault of the hospital or an external factor eg. appointment notification not received, and those reasons which were the patients fault eg. forgetting the appointment. It was shown that there was no significant difference between the two data collection techniques and these response categories.

The main reason in this study for not attending was that the patient claimed that they had already cancelled the appointment. No data was collected into how long before the scheduled appointment the patient had cancelled but it appears there is a communication problem within the departments. Potamitis et al (1994) found this problem to a lesser extent with only 8.7% of new patients stating that they had already cancelled and again identified a lack of communication. As long as the patient gave at least 24 hours notice, other patients could be contacted to fill the appointment slot. The prime importance should be to fill the clinics with scheduled appointments rather than have medical staff unoccupied. The problem has been overcome to some extent within the PCC where inappropriate patients arriving at the AED department are diverted to fill empty slots in

the PCC lists. The problem cannot be so easily overcome at CEB where the DNA rate is higher anyway. The fact that many patients fail to attend due to administrative problems is also highlighted in a study by Frankel et al (1989). It was found that administration errors were the main reason for DNA's. In other studies this has been found to be a lesser factor (Alpert, 1964; Bigby et al, 1984; Shah et al, 1977; Verbov, 1992; Walsh et al, 1967).

If hospital records are not up to date or information is incorrectly recorded then patients may fail to receive appointments (Verbov, 1992). A large number of the DNA patients in this study claimed that they had not received their appointments. It is difficult to apportion blame in these cases though it was shown several times that incorrect information had been given to the hospital by the referee or that it had been misread by the hospital. In these cases it is the referee's responsibility to give the hospital correct and clearly recorded information, and up to the patient to give that referee the correct and up to date information. In one case a hospital appointment was sent to a patient's parents' address and by the time he received it, the scheduled appointment date had passed. The patient had not updated his new address with his GP and hence the failed appointment had resulted.

Long waiting times from referral to appointment were significantly related to non-attendance in one study (McGlade et al, 1988). Appointment reminders in such cases would appear to be beneficial.

Some patients had not attended because their condition had got better. Robin (1976) found that the waiting list can act as a screening mechanism. He found that patients who had failed to attend were those that were best able to manage without help. Certainly no deaths or hospitalisations were found to be the consequence of missed appointments in one American study (Bigby et al, 1984). Any morbidity that was associated with the no-show behaviour seemed to be more a function of general poor compliance with the overall medical regimen rather than a specific complication of the missed appointment itself.

Predictive Analysis

The analysis did not improve the ability to predict the patients who will not attend the clinic. It was concluded that the best assumption for this clinic is to assume that all the patients will attend. In organisational terms it would be preferable to "overbook" by a factor based on historic data. These results are very similar to work conducted by Dervin et al (1978) which came out with a similar conclusion. It may be that clinics with higher

DNA rates would benefit from such an analysis.

Strategies to reduce the DNA rate

Many patients admitted forgetting their appointments (Alpert, 1964; Shah et al, 1977; Verbov, 1992; Walsh et al, 1967). 7 patients in this study admitted that they forgot the appointment. Reminder cards have been shown to reduce the DNA rate and increase the number of patients who cancel their appointments (Bigby et al, 1983; Grover et al, 1983; Go and Becker, 1979). When letters were sent or patients telephoned, the non-attendance was reduced from 24% to 14% in the study by Bigby et al (1983), and by 50% in the study by Grover at al (1983). No difference was shown between the effectiveness of posted or telephoned reminders (Bigby et al, 1983).

These result compare with Hagermann's study (1978) of appointment reminders in a primary care centre in America. The DNA rate decreased but it was not a statistically significant improvement. It was concluded that because the DNA rate was very low initially (6.05%), then little improvement could be achieved. However, the study did increase the number of patients cancelling appointments in advance. This is obviously advantageous in that vacant slots in the clinic schedule can be filled, if the system works effectively enough to allow this. Bigby et al (1983) found no change in the number of cancellations when appointment reminders were used.

Torgerson et al (1993) used a slightly modified approach requesting patients to confirm their appointments. If no confirmation was made then their appointment slot was offered to someone else. This was found to reduce the rate of DNA from 20% to 2% in their osteoporosis screening clinic.

The clinic waiting list and the techniques used to gather patient responses, may affect the likelihood of patients admitting they have forgotten. Patients in this study were asked to record the length of time between receiving the appointment and attending in order to discover if the former factor was important. It is unlikely that the responses are accurate but they illustrate a rough approximation. Although attenders, on average, stated that they had more notice than the non-attenders (ie more time to reschedule commitments, more time to forget) there was found to be no significant difference between the two groups. Frankel et al (1989) identified a similar trend with non-attenders being given less notice of the appointment.

One of the most frustrating scheduling problems at MEH is that appointments cannot be given over the telephone and it is therefore difficult to accommodate patients into

appointment slots which are convenient to them. One patient who was contacted in the telephone interview had cancelled his appointment three times (1 was recorded as a DNA). He found it difficult to take time off work and had a very complex shift pattern which meant it was changing each week. Inflexible systems frustrate patients, involve more staff time, waste clinic appointments and ultimately cost money.

Many of the reasons for patients failing to attend could be solved by following patients up more closely. Attempting to contact DNA patients, if at all possible, by telephone, would instantly solve many administration errors. Secondly, if the patient is unavailable, the referee could confirm patient details and possibly provide the hospital with a contact telephone number so that problems could again be solved.

Making initial appointments by telephone may help reduce the DNA rate. The patients daytime number would need to be provided by the referee when the referral was made. At Leicester General Hospital they have used this technique. After 4 months the DNA rate, in 12 clinics, reduced from 11% to 1% (Audit Commission, 1993).

A more active solution to the problem would be to send patients reminders of the appointment. Trails of such a solution should be conducted. A more refined approach may be to identify asymptomatic patients when the referral letters are scrutinised and to send reminders to patients most likely not to attend. Certainly the problem is a complex one and as the discriminant analysis showed, a DNA patient does not neatly fall into a statistical model to allow easy prediction of the patient's likelihood to attend. The financial viability of reducing the problem would also need to be assessed as to whether the amount of money required to reduce the DNA rate by a given amount would be worthwhile. However, there will always be patients who fail to attend whatever interventionist approach the hospital takes.

7. CONCLUSIONS AND RECOMMENDATIONS

Delays, inadequate information and missing ophthalmic practitioner's correspondence do not help the HES prioritise appointments or make initial assessments regarding the ocular status of their new patients. The ophthalmic profession has long recognised many inadequacies identified in this thesis but there has been insufficient evidence to substantiate these suspicions.

The Present Ophthalmic Referral Process

The GP, OO and OMP are all involved in referring patients to the HES. Referral correspondence is the only contact between these professionals within the community, who have decided that the patient requires a more specialised form of care, and the professional who is required to help that patient within the HES. Several studies concluded that stylised formats would provide more referral information than letters (Montalto, 1991; Morrison and Pennycock, 1991; Thurston et al, 1982; Walsh, 1985). However, in this study the format made no difference to the quantity of information in the Ophthalmic referrals. No improvements have been identified with new formats. This applies equally to AED and OPD referrals.

Some members of all the professions were identified as sending high quality correspondence, with all the relevant information and results enclosed. Others fell well below what should be considered acceptable, failing to include a diagnosis, symptoms or test/investigation results. Considerable variation between and within the professions was identified. This was the first study to review ophthalmic referral correspondence in such detail, although Jones et al (1990) identified a similarly large variation in the quality of ophthalmic referrals in Manchester. There is a need for the professions to monitor the standards and implement procedures to improve weak referrals.

The studies in London and in Birmingham have identified similar but not identical referral trends. Some differences were regional eg. the 'quality' of OO glaucoma referrals was better in BMEH. The proportion of referrals received from each professional group was significantly different in the two studies and differences in the preference of referral correspondence format were also identified. It was disappointing that some of these variables could not be followed up in the questionnaires to OOs and GPs, which were conducted before much of the other research had been completed.

Patients were generally satisfied with the standard of care that they had received prior to

attending the HES. However, considerable delays were identified in many of their referrals, between the patient being referred and the letter arriving at the HES, which were unacceptable. A median two week delay between OO/OMP referral via the GP to MEH was identified. This was identical to work conducted by Linnell (1995) and would appear acceptable, however the sizable data spread is of great concern. It indicates that some patients are being put, or are putting themselves, at risk of permanent visual loss. It illustrates a problem with the present referral process that such delays are possible. It also leads to speculation that patients may be lost from the referral process completely. There is presently no safeguard to prevent this from occurring.

Optometrists would like more feedback from their referrals. At present they appear to get virtually none and this problem should be addressed. This was not previously known to be a wide spread problem. OOs need feedback to improve referrals. Feedback of information can only aid the on going care of the patient, allowing the practitioner to refine his/her own referral protocols. The problem needs to be addressed if the best interests of the patients are to be secured.

In the main, GPs refer anterior conditions, a trend noted in other studies (Harrison et al, 1988; Jones et al, 1990; McDonnell, 1988). Accuracy of these referrals was high for external conditions, although only 62% GP referrals stated a diagnosis. GPs frequently failed to add vital general medical information in their own referral; whereas just less than 40% gave any information relating to the patients ocular history, only about 20% of GPs added information relating to the patient's general health and/or medication. GPs stated the urgency of referral in just 1 in 100 referrals.

OOs initiate more than one third of ophthalmic referrals. They are responsible for identifying many sight-threatening conditions referred to the HES eg. glaucoma, maculopathy. Referral correspondence contains many test and examination results, and the diagnosis is more likely to be stated then in GP referrals. The accuracy of OO glaucoma referrals was similar to Clearkin and Harcourt (1983) with less than 50% referrals being confirmed or high risk. Other studies found accuracy to be much greater (Brittain et al, 1988; Harrison et al, 1988; Tuck and Crick, 1991). Accuracy of glaucoma referrals was greater when IOP was higher, when there was a greater difference between the IOP in each eye, and when the patients were older.

Complete and accurate referrals aid prioritisation of appointments. This is crucial as any unnecessary delay in treatment might put the patient's sight at risk. In addition, a complete referral assists the ophthalmologist who is scrutinising the referral to make a

judgement as to the probable examinations which will be required. At MEH these examinations are frequently booked in advance of the patient attending eg visual fields examination, refraction. Full referrals also may save clinic time because it may assist the ophthalmologist examining the patient. The poor standard of some referrals is not helping the HES deal effectively with all new ophthalmic patients.

GPs are referring some patients to the HES rather than to the OO because of eye examination charges. This was suspected by Henderson et al (1990) who noted an increase in elderly patients referred following the introduction of the examination charges. The extent of this referral practice needs investigating. It is not an effective use of resources to send a patient to the HES unnecessarily, especially when all they require is a new prescription in their spectacles.

GPs agreed that they are not functioning as effective gatekeepers for ophthalmic referrals from OOs and OMPs. Perkins (1990) evidence that GPs are effective in this role was only from his own experience and his results did not appear to support his conclusions fully. In the main, GPs do not have the equipment or the training to interfere with the decision of the OO or OMP.

The added value of an OO or OMP referring a patient via the GP to the HES is low. Jones et al (1990) recorded additional information from the GP in only 35% OO referrals to the Manchester Eye Hospital. In this study of referrals to MEH and BMEH no more than half of GPs added any information to the OO/OMP referrals, a figure similar to a Scottish study (Kljakovic et al, 1985). Long delays along this referral pathway were also identified and the continuing use of this referral pathway is difficult to justify. It is unlikely that direct referral of some conditions would considerably alter the number of referrals received at the HES. Whether OOs would be placed under greater pressure by patients seeking referral is difficult to predict.

Most OOs and GPs questioned felt that some patients would benefit from direct referral and the advantages are clear. Present legislation does not restrict direct referral. The Opticians Act 1989 states that referral must be made to a registered medical practitioner. Health Authority contracts could also be fulfilled with OOs and OMPs informing the patient's GP that the referral had been made.

Many referrals to the AED were identified as an inappropriate use of this emergency service. Further evidence has since been put forward by a similar study in the AED at BMEH (Kheterpal et al, 1995). Approximately half the patients referred had conditions that were long standing and a course of treatment had previously been undertaken.

Greater teaching at an undergraduate level would help many GPs make a more appropriate judgement about the management of the condition (RCOphth, 1995).

The evidence adduced during this study must lead to the conclusion that the ophthalmic referral process is not an effective means of transferring patients from the community to the care of the HES. The thesis hypothesis must therefore be rejected.

The HES - Processing Referrals

The large numbers of patients who are failing to attend their appointments due to hospital administrative problems was clearly identified in this study. This indicates that the processing of the referrals, once they are received by the hospital is not as effective as it should be. There is a requirement to be more responsive to the needs of the patient and a more flexible approach to appointment allocation would help this. The success of a flexible approach by Leicester General Hospital, giving patients a choice of appointment time (Audit Commission, 1993), appears to be much needed at MEH.

Community clinics provide a more accessible clinic for some patients and the majority of patients were satisfied with the care that they received. A small number of patients perceived that the quality of care was inferior to that provided within the main hospital. Although this group of patients was small it is of concern that some patients may have this opinion. This factor requires further investigation especially with the increasing moves towards community based services. Equally, some patients stated that the main hospital clinic would have been a more convenient site for them (see chapter 5). It is vital that community based services are fulfilling their objective of providing a more convenient service.

Recommendations

Direct Referral by Ophthalmic Practitioners

A pilot scheme should be conducted to assess direct referral to the HES from Ophthalmic Practitioners. Piloting in defined areas, where practitioners have a recognised referral hospital would allow the scheme to be effectively monitored. Full cooperation of the GPs and OOs involved would be essential, as would the full knowledge and cooperation of the local hospital. Local Optical Committees and Local Medical Committees, which are recognised by Health Authorities as representative professional groups(Health Authorities Act, 1995), would be ideally placed to implement such a scheme. Sight threatening conditions would be referred following local protocols and referral forms. A pilot study

with interested OOs and local GPs, both GPFHs and non GPFHs should be established. The GP would need to be kept informed when any patient was referred.

It is difficult to assess whether the number of referrals arriving at the HES would significantly increase. It may be that because the process was working more effectively then more of the patients who required secondary care would be given a hospital appointment; patients would not be so easily lost, there would be fewer delays, and GPs would not block appropriate referrals. OOs may be under greater pressure from their patients to refer, but their legal responsibility would remain the same - the practitioner would still be referring the patients with an ocular abnormality to a medical practitioner (Opticians Act, 1989). A study to test the hypothesis that there is an improvement in the effectiveness of directly referring patients with sight-threatening conditions from the Ophthalmic Practitioner to the HES, rather than via the GP, should be conducted. Efficiency should then be assessed based on the speed of the referral and the subsequent cost savings due to the reduction in GP consultation time.

Improving the Standard of Referral

Compulsory continuing professional development helps to ensure that practitioners keep abreast of the latest advances in research and updated clinical practice. This would undoubtedly improve the practitioners referral practice.

OOs should receive feedback on their referrals from the HES and/or GP. This would not only improve the ongoing care of the patient, but help OOs to assess their performance. This could be facilitated with better local cooperation. LOCs could negotiate with Hospital Consultants to encourage this practise.

The Role and Organisation of the Ophthalmic AED

The role of the Ophthalmic AED should be redefined. The extended role that the AED is presently providing needs to be recognised. Consideration as to whether such a role is appropriate requires urgent review within the Health Service. In addition, future research should review the referrals to ophthalmic AEDs by GPFHs.

Ophthalmic Care within the Primary Care Sector

Ophthalmic care within the community should involve a closer working relationship between the GP and the OO and OMP. This is already underway in many areas with the evolution of shared care (AOP, 1994).

The ophthalmic role of some GPs within the community should be improved. This means that GPs should always include the patient's medical and drug history in referral letters and make an assessment of the patient's vision or visual acuity prior to referral. By recording the patients pinhole acuity the GP can also judge whether a reduction in vision is due to the need for new spectacles or if HES referral is required. Greater input at undergraduate level is also vital and is widely called for (eg. RCOphth, 1995; Vernon, 1988). Greater emphasis on postgraduate training of GPs in ophthalmology should be encouraged with the HES playing an important role.

OOs could undertake part of the role of the GP within the primary care setting. This should involve diagnosing conditions and treating minor ophthalmic conditions. The GOC can legislate on the use of drugs under The Opticians Act 1989 section 31, to allow such an extended role for the OO.

Meeting the needs of referred patients

There is a need to be more responsive to the patient and a more flexible approach to appointment allocation would help this process. Offering appointments to patients by telephone, booking patients of working age early morning appointments, and allocating appointments to senior citizens to allow them to take advantage of free public transport, would make a considerable difference to patients. It should also improve the running of clinics, especially community-based services.

Secondary Ophthalmic Care in the Community

It should be made clear to patients, when the appointment is made, that the community based clinic is providing an equivalent level of care to that which would be received within the main hospital. Present patient literature is not available in large print or in different languages which may be limiting it's effectiveness. More research into the patient's perception of community based services is urgently required if the service is to be marketed more effectively.

Delayed Referrals

The large delays seen in some referrals suggest that there may be patients who are lost from the referral process. This study, based within the HES, was not able to identify such patients. It is important that further work is conducted to identify whether this is actually a problem. A detailed study following OO referrals should be effective in monitoring and

identifying such problems. Patients lost from this process may be at serious risk of loss of vision and yet the present referral process has no built in checks to reduce such an occurrence.

The Future Ophthalmic Referral Process

Computer linked referrals would improve the referral process. Systems to ensure that the referees include all the information required by the recipient could be built in. A network linking the GPs with the HAs is already underway. By adding the other primary health care providers and hospitals to this network a more efficient referral process would be possible.

There are considerable opportunities at the present time to improve the eye care available to patients. With an ever increasing elderly population the demand for Ophthalmology services will continue to increase. Improved communication between the Professions is vital if improvements are to be achieved. Many recommendations put forward in this thesis will only be successful if the Professions agree criteria and share expertise.

This study has successfully analysed the ophthalmic referral process. The results are wide reaching and it is hoped that the conclusions will not only help in the planning of HES clinics, but also refine the interfaces between the ophthalmic practitioner, the GP and the HES. The present referral process has evolved as a process which must now be restructured and streamlined. Such changes may need to be imposed in order for improvements to be put in place. By improving the design of the referral process all the services will interact more effectively, resources will be better targeted and ultimately the patients will benefit.

References and Bibliography

ADDLEY, K., DUFFY, C. (1982).
General Practitioner Referral Letters - The Concept of Fixed-Heading Format.
Ulster Medical Journal
51 : 136-40.

ALLEN, D. (1991).
The Urgent Referral.
Optician
February 15 : 14-21.

ALPERT, J.J. (1964).
Broken Appointments
Pediatrics
July : 127-32.

AOP - see Association of Optometrists

ARMSTRONG, D., FRY, J., ARMSTRONG, P. (1991).
Doctors' perceptions of pressure from patients for referral.
British Medical Journal
302 : 1186-8.

ASSOCIATION OF OPTOMETRISTS (1994).
Shared Care. A second Report on Shared Care in Ophthalmic Services.
AOP, London.

ASSOCIATION OF OPTOMETRISTS/BRITSH MEDICAL ASSOCIATION (1995).
Revised GOS 18 Form: Guidance for Optometrists.

AUDIT COMMISSION (1993).
What Seems to be the Matter: Communication between Hospitals and Patients.
HMSO, London.

AUDIT COMMISSION (1996a).
By Accident or Design. Improving A&E Services in England and Wales.
HMSO, London.

AUDIT COMMISSION (1996b).
What the Doctor Ordered. A Study of GP fundholders in England and Wales.
HMSO, London.

AWH, C.C., CUPLLES, H.P., JAVITT, J.C. (1991).
Improved Detection and Referral of Patients With Diabetic Retinopathy by Primary Care Physicians. Effectiveness of Education.
Archives of International Medicine
151 (July) : 1405-8.

BAKER, R. (1991).
Audit and standards in new general practice.
British Medical Journal
303 : 332-334.

BALL, G.V. (1982).
Symptoms in eye examinations.
London, Butterworths.

BENZEVAL, M., JUDGE, K., SOLOMON, M. (1992).
The Health Status of Londoners. A comprehensive perspective.
(King's Fund: London).

BHOPAL, R.S., HEDLEY, A.J. (1985).
Screening of diabetics for retinopathy by ophthalmic opticians.
British Medical Journal
290: 1589.

BHOPAL, R.S., PARKIN, D.W., GILLIE, R.F., HAN, K.H. (1993).
Pattern of ophthalmological accidents and emergencies presenting to hospitals.
Journal of Epidemiology and Community Health
47 : 382-7.

BIGBY, J.A., GIBLIN, J., PAPPIUS, E.M., GOLDMAN, L. (1983).
Appointment Reminders to Reduce No-Show Rates.
The Journal of the American Medical Association
250 (13): 1742-5.

BIGBY, J.A., PAPPIUS, E., COOK, F., GOLDMAN, L. (1984).
Medical Consequences of Missed Appointments.
Archives of International Medicine
144 : 1163-6.

BLACH, R. (1993).
The management of diabetic retinopathy.
British Journal of Optometry and Dispensing
1 (1): 12-15.

BOGGON, D.G. (1992).
GPs and optometrists
British Journal of General Practice
42 (357) : 169.

BOLINGBROKE HOSPITAL, WANDSWORTH (1996).
Personal Communication.

BRITTAIN, G.P.H.,AUSTIN, D.J.and KELLY, S.P. (1988).
A prospective survey to determine sources and diagnostic accuracy of glaucoma referrals.
Health Trends
20 : 43-4.

BRITISH MEDICAL ASSOCIATION, THE ROYAL PHARMACEUTICAL SOCIETY OF GREAT BRITAIN (1995)
British National Formulary
29 : March.

BRON, A.J. (1985).
Screening for treatable diabetic retinopathy.
British Medical Journal
290 : 1025-6.

BRUCE, I., MCKENNELL, A., WALKER, E. (1991).
Blind and Partially sighted adults in Britain: the RNIB survey.
London. HMSO.

BURKEY, Y., ROLAND, M., CORKILL, C., NEWTON, P. (1995).
Referrals between specialists in hospital outpatient departments.
Health Trends
27(3): 76-79.

BURNS-COX, C.J. and DEAN HART, J.C. (1985).
Screening of diabetics for retinopathy by ophthalmic opticians.
British Medical Journal
290 : 1052-4.

BUXTON, M.J., SCULPHER, B.A., FERGUSON, B.A., HUMPHREYS, J.E., ALTMAN, J.F.B., SPEIGELHALTER, D.J., KIRBY, A.J., JACOB, J.S., DUDBRIDGE, S.B., STEAD, J.W., FEEST, T.G., CHENG, H., COURTNEY, P., TALVOT, J.F., AHMED, R., DABBS, T.R. (1991).
Screening for Treatable Diabetic Retinopathy: a Comparison of Different Methods.
Diabetic Medicine
8 : 371-7.

CARPENTER, P.J., MORROW, G.R., DEL GAUDIO, A.C., RITZLER, B.A. (1981).
Who keeps the First Outpatient Appointment?
American Journal of Psychiatry
138 (1) : 102-5.

CARTWRIGHT, A. (1988).
Health Surveys in Practice and in Potential. A Critical Review of Their Scope and Methods.
Kings Fund Publishing, London.

CAWLEY, M.E.and STEVENS, F.M. (1987).
Non-attendance at outpatient clinics at the regional hospital, Galway, Ireland.
Social Science and Medicine
25 : 1189-96.

CHEW, R. (1995).
Compendium of Health Statistics (9th Edition).
Office of Health Economics, London.

CHIAPELLA, A.P., ROSENTHAL, A.R. (1985).
One year in an eye casualty clinic.
British Journal of Ophthalmology
69 : 865-70.

CHRISTOFFERSEN, T., HOLTEDAHL, K., FORS, T., RINGBERG, U. (1993).
Tonometry in the general practice setting (II): Which cut-off point for referral - for which patients?
Acta Ophthalmologica
71 : 109-13.

CLAOUÉ, C.M.P. (1988).
Requirements and characteristics of 500 consecutive patients consulting an ophthalmic medical practitioner.
Journal of the Royal Society of Medicine
81 : 394-6.

CLAOUÉ, C. (1993).
Personal communication.

CLEARKIN, L. and HARCOURT, B. (1983).
Referral Patterns of True and Suspected Glaucoma to an Adult Ophthalmic Outpatient Clinic.
Transactions of the Ophthalmological Societies of the United Kingdom
103 : 284-7.

CLEARY, P.D., MCNEIL, B.J. (1988).
Paitent Satisfaction as an Indicator of Quality Care.
Inquiry
25 : 25-36.

CLINICAL STANDARDS ADVISORY GROUP. (1994).
Standards of Clinical Care for People with Diabetes. Report of a CSAG Committee and the Government Response.
HMSO, London.

COptom - see THE COLLEGE OF OPTOMETRISTS

CORNEY, R. (1994).
Experiences of first wave general practice fundholders in South East Thames Regional Health Authority.
British Journal of General Practice
44 : 34-37.

COULTER, A., NOONE, A., GOLDACRE, M. (1989).
General practitioners' referrals to specialist outpatient clinics. I. Why General practitioners refer to specialist outpatient clinics.
British Medical Journal
299 : 304-6.

COULTER, A., SEAGROATT, V., McPHERSON, K. (1990).
Relation between general practices' outpatient referral rates and rates of elective admission to hospital.
British Medical Journal
301 :273-6.

CRICK, R.P. (1982).
Early Detection of glaucoma.
British Medical Journal
285 : 1063-4.

CRICK, R.P. (1989).
Criteria for GP referral.
Personal Communication.

CRICK, R.P., CREABY, E., FREEMANS, S. (1982).
Who detects Glaucoma in the UK?
The Dispensing Optician
November 192-4.

CROMBIE, D.L. and FLEMING, D.M. (1988).
General Practitioner referrals to hospital: the financial implications of variability.
Health Trends
20 : 53-6.

CURRAN, P. (1992).
Using the ophthalmic green form in practice.
Pulse of Medicine
April 18 : 63-4.

DALE, J., GREEN, J., GLUCKSMAN, E., HIGGS, R. (1990).
An Evaluation of Treatment of Primary Care Attenders at an Accident and Emergency Department.
The Journal of Emergency Medicine
8 : 377.

DART, J.K.G. (1986).
Eye disease at a community health centre.
British Medical Journal
293 : 1477-80.

DAUBS, J.G. and CRICK, R.P. (1981).
Effect of refractive error on the risk of ocular hypertension and open angle glaucoma.
Transactions of the Ophthalmological Societies of the United Kingdom
101 : 121-6.

DAVIES, E.G., PETTY, E.M., KOHNER, E.M. (1989).
Long Term Cost Effectiveness of Photocoagulation for Diabetic Maculopathy.
Eye
3 : 764-767.

DAVISON, A.G., HIDLREY, A.C.C., FLOYER, M.A. (1983).
Use and misuse of an accident and emergency department in the East End of London.
Journal of the Royal Society of Medicine
76 : 37-40.

DE ALARCON, R. and HODSON, J.M. (1964).
Value of the General Practitioners' Letter. A Further Study in Medical Communication.
British Medical Journal
2 : 435-438.

DE MARCO, P., DAIN, C., LOCKWOOD, T., ROLAND, M. (1993).
How valuable is feedback of information on hospital referral patterns?
British Medical Journal
307 : 1465-1466.

DEPARTMENT OF HEALTH (1989).
Working for Patients.
HMSO: London.

DEPARTMENT OF HEALTH (1993).
Making London Better.
Health Publications Unit, Manchester

DEPARTMENT OF HEALTH (1995).
The Patient's Charter & you.
DOH, London.

DEPARTMENT OF HEALTH AND OFFICE OF POPULATION CENSUSES AND SURVEYS (1995).
The Government's Expenditure Plans 1995-96 to 1997-98.
HMSO: London.

DEPARTMENT OF HEALTH AND SOCIAL SECURITY (1987).
Promoting Better Health. The Governments Programme for Improving Primary Health Care.
HMSO. London.

DERVIN, J.V., STONE, D.L., BECK, C.H. (1978).
The No-show Patient in the Model Family Practice Unit.
The Journal of Family Practice
7 (6) : 1177-1180.

DEYO, R.A., DIEHL, A.K. (1986).
Patient Satisfaction with Medical Care for Low-Back Pain.
Spine
11 (1) : 28-30.

DICKEY, W. and MORROW, J.I. (1991).
Can outpatient non-attendance be predicted from the referral letter? An audit of default at neurology clinics.
Journal of the Royal Society of Medicine
84 : 662-3.

DIXON, P., CARR-HILL, R. (1989).
The NHS and its Customers. Part III, Customer Feedback Surveys, A Review of Current Practice.
Centre of Health Economics, University of York, York.

DUKE, J.S. (1986).
What a Consultant Wants to Know From a GP.
Patient Management
May : 135-40.

DUNN, G.M. (1986).
Optometry: progress or decline?
Optometry Today
February 1: 64-7.

EDWARDS, R.S. (1987).
Ophthalmic emergencies in a district general hospital casualty department.
British Journal of Ophthalmology
71 : 938-42.

EPSTEIN, O. (1989).
The transformation of letter writing with information technology.
British Journal of Hospital Medicine
41: 177-181.

FEATHERSTONE, P.I., JAMES, C., HALL, M.S., WILLIAMS, A. (1992).
General Practitioners' confidence in diagnosing and managing eye conditions : a survey in South Devon.
British Journal of General Practice
42 : 21-4.

FEDERATION OF OPHTHALMIC AND DISPENSING OPTICIANS (1995).
Optics at a Glance.
(FODO: London).

FENDRICK, A.M., JAVITT, J.C., CHIANG, Y.P. (1992).
Cost-Effectiveness of the screening and treatment of diabetic retinopathy.
International Journal of Technology Assessment in Health Care
8 (4) : 694-707.

FERTIG, A., ROLAND, M., KING, H., MOORE, T. (1993).
Understanding variation in rates of referral among general practitioners: are inappropriate referrals important and would guidelines help to reduce rates?
British Medical Journal
307 : 1467-70.

FINLAY, R., GRIFFITHS, J., JACKSON, G., LAW, D. (1991).
Can General Practitioners screen their patients for diabetic retinopathy?
Health Trends
23 : 104-5.

FINK, A., WRIGHT, L., WORMALD, R. (1994).
Detection and prevention of treatable visual failure in general practice: room for improvement?
British Journal of General Practice
44 : 587-9.

FITZPATRICK, R., HOPKINS, A. (1993).
Measurement of patients' satisfaction with their care.
Royal College of Physicians, London.

FLEMING, D. (1992).
The interface between general practice and secondary care in Europe and North America.
IN : Hospital Referrals
Oxford General Practice Series Volume 22. ed. by Roland, M. and
Coulter, A. (Oxford: Oxford University Press).

FOSTER, J.J. (1993).
Starting SPSS/PC+ and SPSS for Windows
2nd Edition, Sigma Press, Wilmslow, UK.

FRANKEL, S., FARROW, A., WEST, R. (1989).
Non-attendance or non-invitation? A case-control; study of failed outpatient appointments.
British Medical Journal
298 : 1343-5.

FRANKS, W., DIGGORY, P. (1995).
Glaucoma: management and drug therapies.
Prescriber
February : 37-46.

FRENCH, C.N. (1987).
Ideal average times for sight test.
Optometry Today
27 : 741-3.

FRENCH, K., PORTER, A.M.D., ROBINSON, S.E., McCALLUM, F.M., HOWIE, J.G.R., ROBERTS, M.M. (1982).
Attendance at a breast screening clinic: a problem of administration or attitudes?
British Medical Journal
285 : 617-20.

FROST, E. (1995).
Personal Communication.

FRY, J. (1993).
General Practice, The Facts.
Radcliffe Medical Press Ltd., Oxford.

FRY, L. (1960).
Casualties and Casuals
The Lancet
(i) 163-6.

FRY, L. (1981).
The GP and the Specialist - Dermatology.
British Medical Journal
284: 1093-1094.

GABBA, J. (1995).
The Health Authorities Bill
British Medical Journal
310: 1421-1422.

GARDNER, J.M. (1994).
The sight test fee.
British Medical Journal
309 : 1370.

GATES, S.J.and COLBURN, D.K. (1976).
Lowering Appointment Failures in a Neighborhood Health Center.
Medical Care
14 (3) : 263-7.

GATLING, W., HOWIE, A.J., HILL, R.D. (1995).
An Optical Practice Based Diabetic Eye Screening Programme.
Diabetic Medicine
12 (6): 531-536.

GHAFOUR, I.M., ALLAN, D., FOULDS, W.S. (1983).
Common causes of blindness and visual handicap in the west of Scotland
British Journal of Ophthalmology
67 : 209-13.

GILLIE, R.F. (1982).
The source and manner of referral of chronic simple glaucoma patients to hospital.
The Ophthalmic Optician
22 (August 14) : 586.

GILTROW-TYLER, F. (1996).
Clinical Audit.
Optometry Today
January 29: 18-19.

GLOGOW, E. (1970).
Effects of Health Education Methods on Appointment Breaking.
Public Health Reports
85 (5) : 441-50.

GO, H.T. and BECKER, A. (1979).
Reducing Broken Appointments in a Primary Care Clinic.
The Journal of Ambulatory Care Management
May : 23-30.

GOTTLIEB, L.K., SCHWARTZ, B., PAUKER, S.G. (1983).
Glaucoma screening. A Cost Effectiveness Analysis
Survey of Ophthalmology
28 (3) :

GOVERNEMENT STATISTICAL SERVICE (1996).
Department of Health Consultation Tables 1994-1995.
NHS sight tests, vouchers, manpower, premises.
Statistics Division ID.
January.

GRACE, J.F. and ARMSTRONG, D. (1986).
Reason for Referral to Hospital: Extent of Agreement Between the Perceptions of Patients, General Practitioners and Consultants.
Family Practice
3 : 143-147.

GRACE, J.F., ARMSTRONG, D. (1987).
Referral to Hosptial: Perceptions of Patients, General Practitioners and Consultants About Necessity and Suitability of Referral.
Family Practice
4 (3) : 170-175.

GROVER, S., GAGNON, G., FLEGEL, K.M., HOEY, J.R. (1983).
Improving appointment-keeping by patients new to a hospital medical clinic with telephone or mailed reminders.
Canadian Medical Association Journal
129 1101-3.

HAGERMAN, G.A. (1978).
Testing the Mailed Appointment Reminder in Family Practice.
The Journal of Family Practice
7 (1) : 199-201.

HALL, C. (1995).
Father in legal battle over girl's treatment
The Independent
2618 March 10: 3.

HALL, J.A., FELDSTEIN, M., FRETWELL, M.D., ROWE, J.W., EPSTEIN, A.M. (1990).
Older Patients' Health Status and Satisfaction with Medical Care in an HMO Population.
Medical Care
28 (3): 261-270.

HAM, C. (1991).
The New National Health Service. Organization and Management.
Radcliffe Medical Press : Oxford.

HAM, C. (1992).
Health Policy in Britain. The Politics and Organisation of the National Health Service.
Third Edition.
Macmillan : Basingstoke.

HANSAGI, H., CARLSSON, B., OLSSON, M., EDHAG, O. (1987)
Trial of a Method of Reducing Inappropriate Demands on a Hospital Emergency Department.
Public Health
101 : 99-105.

HARPER, R., REEVES, B. (1995).
Screening for primary open-angle glaucoma: a review.
Ophthalmic and Physiological Optics
15 (Supplement 2): s27-s34.

HARRIS, B., FOX, J. (1986).
Eye opener at Bristol hosptial.
The Health Service Journal
March 13.

HARRISON, R.J., WILD, J.M., HOBLEY, A.J. (1988).
Referral patterns to an ophthalmic outpatient clinic by general practitioners and ophthalmic opticians and the role of these professional in screening for ocular disease.
British Medical Journal
297 : 1162-7.

HENDERSON, G., DUNCAN, A., KROMBERG, M., ROBERTS, J., SIM, F., VAFIDIS, G. (1990).
High street eye tests.
British Medical Journal
300 : 1076.

HELLIWELL, P.S., WRIGHT, V. (1991).
Referrals to rheumatology
British Medical Journal
302: 304-305.

HILLER, R., KAHN, H.A. (1975).
Blindness from Glaucoma.
American Journal of Ophthalmology
80 : 62-9.

HITCHINGS, R.A. (1980).
Glaucoma family screening.
Research and Clinical Forums
2 (1) : 21-5.

HITCHINGS, R. A. (1993).
Referral criteria for glaucoma.
Personal Communication.

HOBLEY, A.J., WOODWARD, E.G., PORT, M.J.A. (1992).
Retrospective study of optometric referrals.
Ophthalmic and Physiological Optics
12 : 395-9.

HOLLOWS, F.C., GRAHAM, P.A. (1966).
Intra-Ocular Pressure, Glaucoma and Glaucoma Suspects in a defined population.
British Journal of Ophthalmology
50 : 570-86

HORDER, E. (1988).
Inappropriate use of casualty departments.
Journal of the Royal College of General Practitioners
38: 372.

HORDER, J.P. (1985).
The balance between primary and secondary care - A personal view.
Health Trends
17 : 64-8.

HOWIE, J.G.R. and TAYLOR, J.L. (1982).
Raised intraocular pressure - time for a rethink on referral procedure?
British Medical Journal
285 : 1009-10.

HUGHES, J. and GORDON, P. (1992).
An Optimal Balance? Primary health care and acute hospital services in London.
King's Fund Centre, London.

HULKA, B.S., KUPPER, L.L., DALY, M.B., CASSEL, J.C., SCHOEN, F. (1975).
Correlates of Satisfaction and Dissatisfaction with Medical Care: A Community Perspective.
Medical Care
XIII (8): 648-57.

HUTSON HAY, S. (1977).
Ocular Presentation In The Emergency Department.
Journal of the Medical Association of the State of Alabama
47 (Dec) : 23-4.

JACKSON, C., HIRST, L. (1995).
Bribane GPs' perceptions of screening for open-angle glaucoma.
Australian and New Zealand Journal of Ophthalmology
25(3): 179-181.

JARMAN, B., BOSANQUET, N. (1992).
Primary health care in London - changes since the Acheson report.
British Medical Journal
305 (7 November) : 1130-3.

JONAS, S. (1971).
Appointment-Breaking in a General Medical Clinic.
Medical Care
9 (1): 82-8.

JONES, D.T. (1987).
A survey of hospital outpatient referral rates, Wales, 1985.
British Medical Journal
295 : 734-6.

JONES, N.P., HAYWARD, J.M., KHAW, P.T., CLAOUÉ, C.M.P., ELKINGTON, A.R. (1986).
Function of an ophthalmic "accident and emergency" department: results of a six month survey.
British Medical Journal
292 : 188-90.

JONES, N.P., LLOYD, I.C., KWARTZ, J. (1990).
General Practitioner referrals to an eye hospital: a standard referral form.
Journal of the Royal Society of Medicine
83 : 770-2.

JONES ELWYN, G., SCOTT, N.C.H. (1994).
Avoidable referrals? Analysis of 170 consecutive referrals to secondary care.
British Medical Journal
309 : 576-8.

JUDGE, K., SOLOMON, M. (1993).
Public Opinion and the National Health Service: Patterns and Perspectives in Consumer Satisfaction.
Journal of Social Policy
22 (3) : 299-327.

KANSKI, J.J. (1989).
Clinical Ophthalmology.
2nd Ed. Butterworths, London.

KENTISH, R., JENKINS, P., LASK, B. (1987).
Study of written communication between general practitioners and departments of child psychiatry.
Journal of the Royal College of General Practitioners
37 : 162-3.

KING, A., DAVID, D., JONES, H.S., O'BRIEN, C. (1995)
Factors affecting non-attendance in an ophthalmic outpatient department.
Journal of the Royal Society of Medicine
88 : 88-90.

KIRKBY, G.R. (1994).
The sight test fee.
British Medical Journal
309 : 1370.

KHETERPAL, S., PERRY, M.E., McDONNELL, P.J. (1995).
General Practice Referral Letters to a Regional Ophthalmic Accident and Emergency Department.
Eye
9(supplement): 67-69.

KLJAKOVIC, M., HOWIE, J.G.R., PHILLIPS, C.I., BARTHOLOMEW, R.S., BROWN, J.G.S. (1985).
Raised Intraocular pressure: an alternative method of referral.
British Medical Journal
290 : 1043-4.

KNOTTERUS, J.A., JOOSTEN, J., DAAMS, J. (1990).
Comparing the quality of referrals of general practitioners with high and average referral rates: an independant panel review.
British Journal of General Practice
40 : 178-81.

LACHMAN, P.I., STANDER, I.A. (1991).
The referral letter - a problem of communication.
South African Medical Journal
79 (2) : 98-100.

LAIDLOW, D.A.H., BLOOM, P.A., HUGHES, A.O., MARMION, V.J. (1994).
The sight test fee: effect on ophthalmology referrals and rate of glaucoma detection.
British Medical Journal
309 : 634-6.

LEE, N., CLARIDGE, K., THOMPSON, G. (1992).
Do we require initiatives to reduce ophthalmic outpatient waiting lists?
Health Trends
24 (1) : 30-4.

LEESE, A.M., WILSON, J.A., MURRAY, J.A.M. (1986).
A survey of the non-attendance rate at the ENT clinic of a district general hospital.
Clinical Otolaryngology
11 : 37-40.

LEY, P. (1988).
Communicating with Patients. Improving communication, satisfaction and Compliance.
Chapman and Hall, London.

LHPC - LONDON HEALTH PLANNING CONSORTIUM (1981).

Primary Health Care in Inner London. Report of the Study Group.
Chairman - Professor E.D. Acheson.
DHSS, London.

LINDLEY, D.V., SCOTT, W.F. (1984).
New Cambridge Elementary Statistical Tables.
Cambridge University Press: Cambridge.

LINNELL, A. (1995).
Audit of Glaucoma Referrals to Sutton Hospital, Surrey.
Personal Communication.

LINSKY, R.M.T. (1988).
Diabetic Retinopathy.
Optometry Today
Jan.30, 73-77.

LLOYD, M., BRADFORD, C., WEBB, S. (1993).
Non-attendance at Outpatient Clinics: Is It Related to the Referral Process?
Family Practice
10 (2) : 111-7.

LONG, A., AITKINS, J.B. (1974).
Communications between General Practitioners and Consultants.
British Medical Journal
4 : 456-459.

LYONS, C.J., HINGERFORD, J. (1990).
Detection of Ocular Malignancies
Journal of the Royal Society of Medicine
83 (March) : 165-7.

MACKEAN, J.M., ELKINGTON, A.R. (1982).
Referral routes to hospital of patients with open-angle glaucoma.
British Medical Journal
285 : 1093-5.

MASON, J., DRUMMOND, M. (1995)
Screening for diabetic retinopathy by optometrists: effectiveness and cost-effectiveness.

Discussion Paper 137, University of York.

MAXWELL, R. (1993).
Other cities, same problems.
In : London after Tomlinson: Reorganising Big City Medicine.
British Medical Journal, London.

McCOLL, E., NEWTON, J., HUTCHINSON, A. (1994).
An agenda for change in referral - consensus from general practice.
British Journal of General Practice
44 : 157-62.

McCULLOUGH, C.J. (1993).
Fundholding Practices get Preference.
British Medical Journal
306 (6870): 141.

McDONNELL, P.J. (1988).
How do general practitioners manage eye disease in the community?
British Journal of Ophthalmology
72: 733-6.

McGLADE, K.J., BRADLEY, T., MURPHY, G.J.J., LUNDY, G.P.P. (1988).
Prolonged waiting times for referral to appointment were significantly related to non-attendance.
British Medical Journal
297: 1246-8.

McIVER, S. (1991).
Obtaining the Views of Outpatients.
Kings Fund Centre, London.

MEH - see Moorfields Eye Hospital.

MILLER, S.J.H., PATERSON, G.D. (1962).
Studies on Glaucoma Relatives.
British Journal of Ophthalmology
46 : 513-22.

MONTALTO, M. (1991)
Letters to go: General Practitioners' referral letters to an accident and emergency department.
The Medical Journal of Australia
155 (September 16) : 374-7.

MOORE, A.T., ROLAND, M.O. (1989).
How much variation in referral rates among general practitioners is due to chance.
British Medical Journal
298 : 500-2.

MOORFIELDS EYE HOSPITAL (1992).
Primary Care Clinic. Guidelines for clinicians.

MOORFIELDS EYE HOSPITAL (1993a).
Vision for the Future. An Application for NHS Trust Status.

MOORFIELDS EYE HOSPITAL (1993b).
Community Eye Service, St. Andrews Hospital, Bow.

MOORFIELDS EYE HOSPITAL (1994).
Excimer Laser Surgery - A Guide for Patients.

MORRISON, W.G., PENNYCOOK, A.G. (1991).
A Study of the Content of General Practitioners' Referral Letters to an Accident and Emergency Department.
British Journal of Clinical Practice
45 (2) : 95-6.

MORRISON, W.G., PENNYCOOK, A.G., MAKOWER, R.M., SWANN, I.J. (1990).
The general practitioner's use and expectations of an accident and emergency department.
Journal of the Royal Society of Medicine
83 : 237-40.

MOSER, C.A., KALTON, G. (1983)
Survey Methods in Scial Investigation.
2nd Edition, Gower Publishing Company, Vermont, USA.

MOXON, S. (1995).
The patient who did not attend.
British Dental Journal
179 (8) : 280.

MUGFORD, M., BANFIELD, P., O'HANLON, M. (1991).
Effects of feedback of information on clinical practice: a review.
British Medical Journal
303: 398-402.

NHS Executive (1995).
1995/96 pocket guide to the NHS in London.
NHS Executive South Thames, London.

NYSTROM, L., OSTMAN, J., WALL, S., WIBELL, L. (1992).
Mortality of all incident cases of diabetes mellitus in Swedwn diagnosed 1983-87 at age 15-34 years. Diabetes Incidence Study in Sweden (DISS) Group.
Diabetic Medicine
9 (5): 422-7.

OPCS - OFFICE OF POPULATION CENSUSES AND SURVEYS (1993).
Standard Occupational Classification. Volume 3. Social Classifications and Coding Methodology.
(London: Her Majesty's Stationary Office).

OPCS - OFFICE OF POPULATION CENSUSES AND SURVEYS (1994).
1991 Census Key Statistics for Local Authorities of Great Britain.
(HMSO, London).

PAGANO, R.R. (1994).
Understanding Statistics in the Behavioral Sciences
4th Edition, West Publishing Company, Minneapolis, USA.

PANDIT, J.C. (1994).
Testing acuity of vision in general practice: reaching recommended standard.
British Medical Journal
309 : 1408.

PEASE, R. (1973).
A study of patients in a London accident and emergency department.
The Practitioner
211 (November) : 634-8.

PECKAR, C.O., WISHART, M.S., JALILI, I.K., MATHEW, P.(1994).
Ophthalmic Primary Care: The Warrington Model.
European Journal of Inplant and Refractive Surgery
6 (February) : 2-5.

PEPPIATT, R. (1980).
Patients' use of GPs or accident and emergency departments.
The Practitioner
224 (January): 11-16.

PERKINS, P. (1990).
Outcome of referrals by optometrsits to general practitioners: an 18 month study in one practice.
British Journal of General Practice
40 : 59-61.

PHILLIPS, K.D. (1994).
The sight test fee.
British Medical Journal
309 : 1370.

POOLEY, J.E., WOODWARD, E.G., COOLING, R.J. (1994).
The sight test fee.
British Medical Journal
309 : 1370.

PORT, M.J.A. (1989).
Referrals and notifications by optometrists within the UK: 1988 survey.
Ophthalmic and Physiological Optics
9 : 31-5.

PORT, M.J.A. and POPE, C.A. (1988).
Referrals and notifications by British optometrists.
Ophthalmic and Physiological Optics
8 : 323-6.

POTAMITIS, T., CHELL, P.B., JONES, H.S., MURRAY, P.I. (1994).
Non-attendance at ophthalmology outpatient clinics.
Journal of the Royal Society of Medicine
87 : 591-3.

POTTS, M.J., BURNS-COX, C.J., DEAN HART, J.C. (1988).
Diabetic retinopathy screening by optometrists.
Optometry Today
Dec.17, 715.

PRINGLE, M. (1990).
The new agenda for general practice computing. Time to exploit the potential for improving patient care.
British Medical Journal
301: 827-828.

PURVES, I.N. (1996).
The paperless general practice. It is coming, but needs more professional input.
British Medical Journal
312 (May): 112.

RAO, G.P., MORIARTY, A.P. (1995).
Measuring visual acuity in general practice.
British Medical Journal
310 : 671.

REYNOLDS, G.A., CHITNIS, J.G., ROLAND, M.D. (1991).
General practitioner outpatient referrals: do good doctors refer more patients to hospital?
British Medical Journal
302 : 1250-2.

ROBIN, A. (1976).
Rationing Out-Patients: A Defence of the Waiting List.
British Journal of Psychiatry
129 : 138-41.

ROLAND, M. (1992a)
Measuring the appropriateness of hospital referrals.
In : Hospital Referrals (1992).
Oxford General Practice Series Vol 22,
ed. by M. Roland and A. Coulter. (Oxford: Oxford Unviersity Press)

ROLAND, M. (1992b)
Communication between GPs and specialists.
In : Hospital Referrals (1992).
Oxford General Practice Series Vol 22,
ed. by M. Roland and A. Coulter. (Oxford: Oxford Unviersity Press)

ROSE, D. (1995).
Royal Main Customer Care Officer, London.
Personal Communication

ROSENTHAL, A.R. (1992).
The demand for Ophthalmic Services.
British Medical Journal
305 : 904-5.

ROSS, J.E., BRON, A.J., REEVES, B.C., EMMERSON, P.G. (1985).
Detection of optic nerve damage in ocular hypertension.
British Journal of Ophthalmology
69 : 897-903.

ROYAL COLLEGE OF OPHTHALMOLOGISTS (1995).
Hospital Eye Service

ROYAL COLLEGE OF OPHTHALMOLOGISTS (1996).
Shared Care.

ROYAL COMMISION ON THE NHS (1979).
Report.
HMSO, London.

SALATHIA, K., McILWAINE, W.J. (1995).
General practitioner and hospital letters.
The Ulster Medical Journal
64 (1) : 46-50.

SCOBIE, I.N., MACCUISH, A.C., BARRIE, T., GREEN, F.D., FOULDS, F.D. (1981).
Serious retinopathy in a diabetic clinic: prevalence and therapeutic implications.
The Lancet
September 5 : 520-1.

SCOTT, C. (1961).
Research on mail surveys.
Journal of the Royal Statistical Society
124 (A): 143-205.

SCULPHER, M.J., BUXTON, M.J., FERGUSON, B.A., SPIEGELHALTER, D.J., KIRBY, A.J. (1992).
Screening for Diabetic Retinopathy: A Relative Cost-Effectiveness Analysis of Alternative Modalities and Strategies.
Health Economics
1 : 39-51.

SHAH, C.P., MACBRIDE, J.R., LAMB, G.A. (1977).
Appointment Systems: Why Does a Patient Not Return.
Canadian Journal of Public Health
68 : 148-53.

SHARP, A. (1995).
Glaucoma screening by general practitioner.
Optician
209 No. 5493 (March 17). 18-22.

SHELDRICK, J.H., VERNON, S.A., WILSON, A. (1992).
Study of diagnostic accord between general practitioners and an ophthalmologist.
British Medical Journal
304 : 1096-8.

SHONICK, W., KLEIN, B.W. (1977).
An Approach to Reducing the Adverse Effects of Broken Appointments in Primary Care Systems: Development of a Decision Rule Based on Estimated Condititional Probabilities.
Medical Care
15 (5) : 419-29.

SHUTE, R., JENKINS, D. (1993).
Medical attitudes to optometry.
British Journal of Optometry and Dispensing
1 (1) : 26-33.

SIMCOCK, P.R., JONES, N.P., WATSON, A.P. (1992).
Neurological problems presenting to an ophthalmic casualty department.
Acta Ophthalmologica
70 : 721-4.

SMITH, R.J.H. (1988).
Charging patients for eye tests.
British Medical Journal
296 : 290

SOMMER, A. (1990).
Glaucoma Screening: Too Little, Too Late?
Journal of General Internal Medicine
5 (September/October Supplement) : 533-7.

SOMMER, A., TIELSCH, J.M., KATZ, J., QUIGLEY, H.A., GOTTSCH, J.D., JAVITT, J., SINGH, K. (1991).
Relationship between intra ocular pressure and primary open angle glaucoma among white and black Americans.
Archives of Ophthalmolgy
109 : 1090-1095.

SPONSEL, W.E., (1989).
Tonometry in Question: Can Visual Screening Tests Play a More Decsisive Role in Glaucoma Diagnosis and Management?
Survey of Ophthalmology
33 (supplement) : February.

STEINMANN, W.C. (1982).
The "who" and "how" of detecting glaucoma.
British Medical Journal
285 : 1091-3.

ST.LEGER, A.S., SCHNIEDEN, H., WALSWORTH-BELL, J.P. (1992).
Evaluating Health Services' Effectiveness
Open University Press, Milton Keynes.

STRONG, N.P. (1992).
How optometrists screen for glaucoma: A survey.
Ophthalmic and Physiological Optics
12 : 3-7.

TALKS, J., LINDEMBAUM, K., HOPKISSON, B. (1995).
Measuring visual acuity in general practice.
British Medical Journal
310 : 671.

THE COLLEGE OF OPTOMETRISTS (1991).
Code of Ethics and Guidelines for Professional Conduct.

THE COLLEGE OF OPTOMETRISTS (1995).
Peer Review. (October).

THURSTON, C.J., MITCHELL, R., LITTLE, K. (1982)
A Study of the Contents of Referral Letters from General Practitioners to an Accident and Emergency Department.
Health Bulletin (Edinburgh)
42 : 126-131.

TIELSCH, J.M., KATZ, J., SINGH, K., QUIGLEY, H.A., GOTTSCH, J.D., JAVITT, J., SOMMER, A. (1991).
A Population-based Evaluation of Glaucoma Screening: The Baltimore Eye Survey.
American Journal of Epidemiology
134 (10) : 1102-10.

TOGERSON, D., REID, D., DONALDSON, C., RUSSELL, I., GARTON, M. (1993).
Absent Friends
Health Service Journal
4 November : 33.

TOMLINSON, B. (1992).
Report of the Inquiry into London's Health Service, Medical Education and Research.
HMSO, London.

TREASURE, T. (1989).
What sort of letters should hospital specialists send to GPs?
British Medical Journal
41 : 176-7.

TUCK, M.W. (1988a).
Referrals for Glaucoma; an IGA survey.
Optometry Today
October 22 : 598-602.

TUCK, M.W. (1988b).
Early detection of glaucoma - an IGA survey (Part One)
Optician
April 8 : 12-18.

TUCK, M.W. (1991).
Referrals for suspected glaucoma; an international Glaucoma Association Survey.
Ophthalmic and Physiological Optics
11 : 22-5.

TUCK, M.W., CRICK, R.P. (1989).
Testing and referral for chronic glaucoma.
Health Trends
21 : 131-3.

TUCK, M.W., CRICK, R.P. (1991).
Efficiency of referral for suspected glaucoma.
British Medical Journal
302 : 998-1000.

TUCK, M.W., CRICK, R.P. (1992).
Screening for glaucoma: age and sex of referrals and confirmed cases in England and Wales.
Ophthalmic and Physiological Optics
12 : 400-4.

TUCK, M.W., CRICK, R.P. (1993).
Relative effectiveness of different modes of glaucoma screening in optometric practice.
Ophthalmic and Physiological Optics
13 : 227-32.

TUCK, M.W., CRICK, R.P. (1994).
Use of visual field tests in glaucoma detection by optometrists in England and Wales.
Ophthalmic and Physiological Optics
14 : 227-31.

TUCK, M.W., CRICK, R.P. (1996).
The proportion of confirmed glaucomas who have a family history of the disease.
Ophthalmic and Pysiological Optics

16: 86-87.

TUDOR HART, J. (1989).
What sort of letters do GPs want to receive from hospital specialists?
British Journal of Hosptial Medicine
41 (February) : 175-6.

VERBOV, J. (1992).
Why 100 patients failed to keep an outpatient appointment - audit in a dermatology department.
Journal of the Royal Society of Medicine
85 : 277-8.

VERCOE, S. (1987).
The detection of diabetic retinopathy in general practice.
The Practitioner
231 : 263-6.

VERNON, S.A. (1983).
Analysis of all new cases seen in a busy regional centre ophthalmic casualty department during 24-week period.
The Royal Society of Medicine
76 : 279-82.

VERNON, S.A. (1988).
Eye care and the medical student: where should emphasis be placed in undergraduate ophthalmology.
Journal of the Royal Society of Medicine
81 : 335-7.

VERNON, S.A., HENRY, D.J. (1989).
Do Optometrists Screen for Glaucoma?
Eye
3 : 743-6.

VERNON, S.A., HENRY, D.J., CATER, L., JONES, S.J. (1990).
Screening for Glaucoma in the Community by Non-Ophthalmologically Trained Staff Using Semi Automated Equipment.
Eye
4 : 89-97.

WAINWRIGHT, D. (1996).
The Best of Both Worlds.
Health Service Journal
January 25 : 30-31.

WALLWORK, L.J. (1973).
"Birmingham and Midland" - The Evolution of a Provincial Eye Hospital.
Final Year Dissertation - Ophthalmic Optics.
The University of Aston in Birmingham.

WALSH, J.J., BENTON, J.L., ARNOLD, I.G. (1967).
Why patients break appointments.
Hospital Topics
February 67-72.

WALSH, M.E. (1985).
A Study of the Content of Referral Letters from General Practitoners for Acute Surgical Admissions to a District General Hospital.
Health Bulletin (Edinburgh)
43 : 64-71.

WEBSTER, S.H. (1995).
Professional Misconduct.
Ophthalmic and Physiological Optics
15 : 327-337.

WESTERMAN, R.F., HULL, F.M., BEZEMER, P.D., GORT, G. (1990).
A Study of communication between general practitioners and specialists.
British Journal of General Practice
40 : 445-9.

WILKIN, D. (1992).
Patterns of referral: explaining variation.
In: Hosptial Referrals. Oxford General Practice Series. Volume 22, ed. by Roland, M. and Coulter, A. (Oxford University Press).

WILKIN, D., SMITH, A.G. (1987).
Variation in general practitioners' referral rates to consultants.
Journal of the Royal College of General Practitioners
37 : 350-3.

WILLIAMS, P., WALLACE, B.B. (1974).
General Practitioners and Psychiatrists - Do they communicate?
British Medical Journal
16 March : 505-7.

WILSON, R., WALKER, A.M., DUEKER, D.K., PITTS CRICK, R. (1982).
Risk Factors for rate of progression of glaucomatous visual field loss. A computer - based analysis.
Archives of Ophthalmology
100 : 737-41.

WONG, C.M., BRAZIER, D.J. (1986).
Primary Ophthalmic Care: Why did patients choose to come to the Accident and Emergency Department?
Transactions of the Ophthalmological Societies of the United Kingdom
105 : 510-12.

WOOD, C.M., BOSANQUET, R.C. (1987).
Limitations of direct ophthalmoscopy in the screening of glaucoma.
British Medical Journal
294 : 1587-8.

WOOD, T.C.A., CLIFF, K.S. (1986).
Accident and Emergency Departments - Why People Attend with Minor Injuries and Ailments.
Public Health
100: 15-20.

WOODWARD, E.G., DRUMMOND, M.F. (1984).
Cost Effectiveness in a Hospital Contact Lens Department.
Ophthalmic and Physiological Optics
4 (2): 161-167.

WORLD HEALTH ORGANISATION (1992).
Diseases of the eye and adnexa.
In: International Statistical Classification of Diseases and Related Health Problems. 10th Revision (Vol.1)
(WHO: Geneva).

WORLD HEALTH ORGANISATION (1994).
1993 World Health Statistics Annual.
(WHO: Geneva).

YUDKIN, J.S. (1988).
Charging patients for eye tests.
British Medical Journal
296 : 64.

APPENDIX Ia - GOS18 BEFORE APRIL 1993 (half size)

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G.O.S. 18

N.H.S. GENERAL OPHTHALMIC SERVICES

Reference of patient back to General Medical Practitioner

SECTION 1. To be completed by Ophthalmic Medical Practitioner/Ophthalmic Optician

Patient: Mr./Mrs./Miss.....
(Block Letters)

Address.....

.....

Date of Birth...../...../.....

O.M.P.'s/O.O.'s Name and Address

	V.	Sph.	Cyl.	Axis	Prism	Base	V.A.	ADD	Near V.A.	Previous corrected visual acuity
R.E.										
L.E.										

To Dr. .....

Date .....

.....

I am referring this patient to you because

(continue overleaf if necessary)

If you refer the patient to hospital please send the ophthalmologist this form complete.
If you do not refer the patient please complete Section 3 below and return it to me.

Date ..... Signed.....

SECTION 2. For General Medical Practitioner's use

1. Patient seen and Section 3 returned to O.M.P./O.O. on .....

Or 2. To the Consultant Ophthalmologist .....Hospital

I should be obliged if you would see the patient named above in view of the findings recorded and the following history

(continue overleaf if necessary)

FOR HOSPITAL USE	Date
Section 3 sent to O.M.P./O.O.	.....
G.M.P. advised	.....

Signed.....

Date.....

SECTION 3. Reply by the General Medical Practitioner (if the patient is not referred to hospital) or Ophthalmologist

To .....O.M.P./O.O.

Mr./Mrs./Miss ....of

..... may / should not be supplied

with glasses under the General Ophthalmic Services.

Remarks:

(continue overleaf if necessary)

Name and Address of General Medical Practitioner or Hospital

Signed.....

Date.....

G.O.S. 18

APPENDIX Ib - GOS18 AFTER APRIL 1993 (half size)

NHS General Ophthalmic Services - Referral/Notification of Patient to GMP

SECTION ONE : To Be Sent To GMP — To: Dr.

SURNAME (Mr, Mrs, Miss, Ms.) — OTHER NAME(S):

ADDRESS:

POSTCODE: — TEL NUMBER:

PRESCRIPTION DETAILS FROM CURRENT SIGHT TEST DATE:

	Uncorrected V	Sph	Cyl	Axis	Prism	Base	VA	Add	Near VA	Previous corrected V.A. Date	Date of Birth NHS NUMBER (*If Known*):
RE											Specify Cycloplegic if used.
LE											

PLEASE COMPLETE BELOW AS APPROPRIATE

Disc Appearances: RE ..... LE .....

Intra-Ocular Pressures: RE ..... mmHg LE ..... mmHg Pneumo/Applanation Tonometer

Visual Fields: RE ..... LE ..... (Enclose Copy If available)

POINTS REQUIRING ATTENTION - FOR INFORMATION (AND POSSIBLE REFERRAL):

Name and Address of Optometrist/OMP

I agree / do not agree that any Ophthalmologist to whom I am referred for medical consultation and / or treatment may make information relevant to my eye condition and its treatment available to my Optometrist / Ophthalmic Medical Practitioner.

Signed ..... Date .....

Signed (Optometrist/OMP)

SECTION TWO : To Be Completed By General Medical Practitioner (If not accompanied by formal referral letter)

To: Dr. / Mr. _____

RELEVANT CLINICAL HISTORY-INCLUDE MEDICAL/FAMILY/OPHTHALMIC AND DETAILS OF MEDICATION:

Urgency Rating: Urgent/Soon/In turn

Blood Pressure: mmHg

Urinalysis:

Provisional Diagnosis:

Name and Address of GMP

Signed (GMP) Date

GOS 18 Part One - This part must accompany any referral and be retained by the Ophthalmologist

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APPENDIX Ib - GOS18 AFTER 1993 (half size)

NHS General Ophthalmic Services - Referral/Notification of Patient to GMP

SECTION ONE : To Be Sent To GMP — To: Dr.

SURNAME (Mr. Mrs. Miss. Ms.) — OTHER NAME(S):

ADDRESS:

POSTCODE: — TEL NUMBER:

PRESCRIPTION DETAILS FROM CURRENT SIGHT TEST DATE:

	Uncorrected V	Sph	Cyl	Axis	Prism	Base	VA	Add	Near VA
RE									
LE									

Previous corrected V.A. Date

Date of Birth
NHS NUMBER (*If Known*):

Specify Cycloplegic if used.

PLEASE COMPLETE BELOW AS APPROPRIATE

Disc Appearances: RE ..... LE .....

Intra-Ocular Pressures: RE ..... mmHg LE ..... mmHg Pneumo/Applanation Tonometer

Visual Fields: RE ..... LE ..... (Enclose Copy If available)

POINTS REQUIRING ATTENTION - FOR INFORMATION (AND POSSIBLE REFERRAL):

I agree / do not agree that any Ophthalmologist to whom I am referred for medical consultation and / or treatment may make information relevant to my eye condition and its treatment available to my Optometrist / Ophthalmic Medical Practitioner.

Signed ..... Date .....

Name and Address of Optometrist/OMP

Signed (Optometrist/OMP)

SECTION TWO : To Be Completed By General Medical Practitioner (If not accompanied by formal referral letter)

To: Dr. / Mr. _____

RELEVANT CLINICAL HISTORY-INCLUDE MEDICAL/FAMILY/OPHTHALMIC AND DETAILS OF MEDICATION:

Urgency Rating: Urgent/Soon/In turn

Blood Pressure: mmHg

Urinalysis:

Provisional Diagnosis:

Name and Address of GMP

Signed (GMP) Date

GOS 18 Part Two - To Be Retained By General Medical Practitioner

APPENDIX Ib - GOS18 BEFORE APRIL 1993 (half size)

NHS General Ophthalmic Services - Referral/Notification of Patient to GMP

SECTION ONE : To Be Sent To GMP — To: Dr.

SURNAME (Mr, Mrs, Miss, Ms.) — OTHER NAME(S):

ADDRESS:

POSTCODE: — TEL NUMBER:

PRESCRIPTION DETAILS FROM CURRENT SIGHT TEST DATE:

	Uncorrected V	Sph	Cyl	Axis	Prism	Base	VA	Add	Near VA
RE									
LE									

Previous corrected V.A.

Date

Date of Birth

NHS NUMBER (*If Known*):

Specify Cycloplegic if used.

PLEASE COMPLETE BELOW AS APPROPRIATE

Disc Appearances: RE ..... LE .....

Intra-Ocular Pressures: RE ..... mmHg LE ..... mmHg Pneumo/Applanation Tonometer

Visual Fields: RE ..... LE ..... (Enclose Copy If available)

POINTS REQUIRING ATTENTION - FOR INFORMATION (AND POSSIBLE REFERRAL):

Name and Address of Optometrist/OMP

I agree / do not agree that any Ophthalmologist to whom I am referred for medical consultation and / or treatment may make information relevant to my eye condition and its treatment available to my Optometrist / Ophthalmic Medical Practitioner.

Signed ..... Date .....

Signed (Optometrist/OMP)

SECTION TWO : To Be Completed By General Medical Practitioner (If not accompanied by formal referral letter)

To: Dr. / Mr. _____

RELEVANT CLINICAL HISTORY-INCLUDE MEDICAL/FAMILY/OPHTHALMIC AND DETAILS OF MEDICATION:

Urgency Rating: Urgent/Soon/In turn

Blood Pressure: mmHg

Urinalysis:

Provisional Diagnosis:

Name and Address of GMP

Signed (GMP) Date

GOS 18 Part Three - To Be Retained By Optometrist / OMP

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APPENDIX Ib - GOS18 BEFORE APRIL 1993 (half size)

Ophthalmic Opinion/Notification Form

This Form may be used if a formal report is not being prepared

It should be copied to - Optometrist / OMP

- GMP

Name and Address of Optometrist / OMP

Name and Address of referring GMP

Patient's Name _____

Address _____

_____

_____

Comments

Signature _____ Date _____

GOS 18 Part Four - To Be Retained By Ophthalmologist And Copied To Optometrist / OMP And GMP

APPENDIX Ic - GP REFERRAL FORM - PRL1 (half size)

PATIENT REFERRAL LETTER

GP FH YES NO

HOSPITAL NAME _____

ADDRESS _____

_____ POST CODE _____

REFERRAL NO/DATE _____

HOSPITAL USE ONLY

CONSULTANT _____

DATE [ ][ ][ ][ ] 1 9 [ ][ ]

TIME _____

☐ URGENT ☐ ROUTINE

PLEASE GIVE MY PATIENT AN APPOINTMENT TO SEE _____

AT THE _____ CLINIC I WISH THE HOSPITAL TO ARRANGE TRANSPORT [Y | N]

CONTRACT ID [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ] TYPE _____

PRACTICE DETAILS

REFERRING GP:

☐ *PARTNER* ☐ *LOCUM* ☐ *TRAINEE* ☐ *ASSISTANT*

NAME _____

CODE [ ][ ][ ][ ][ ][ ][ ][ ]

ADDRESS _____

POST CODE _____

TEL NO _____

PRACTICE CODE [ ][ ][ ][ ][ ][ ]

REGISTERED GP NAME _____

CODE [ ][ ][ ][ ][ ][ ][ ][ ]

ADDRESS _____

POST CODE _____

TEL NO _____

PRACTICE CODE [ ][ ][ ][ ][ ][ ]

GPFH NAME & ADDRESS _____

GPFH CODE [ ][ ][ ][ ]

TEL NO _____ POSTCODE _____

TREATMENT CODE [ ][ ][ ][ ][ ][ ][ ][ ][ ] EXPECTED TREATMENT DATE [ ][ ][ ][ ] 1 9 [ ][ ] EXPECTED COST £ _____

PATIENT DETAILS

NHS NO [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

DOB [ ][ ][ ][ ] 1 9 [ ][ ] SEX _____

HOSPITAL NO [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

TITLE ____ FAMILY /SURNAME _____

FIRST NAME S _____ _____

PREVIOUS SURNAME _____

USUAL ADDRESS _____

POST CODE _____

TEL NO _____

PREVIOUS ADDRESS _____

POST CODE _____

ADDRESS FOR APPOINTMENT (IF DIFFERENT) _____

POST CODE _____

TEL NO _____

TEMPORARY RESIDENT [Y | N] OVERSEAS VISITOR [Y | N]

LANGUAGE _____

APPENDIX Ic - PRL1 Half size

CLINICAL DETAILS

REFERRAL NO [ ] CONSULTANT _____ DATE [ ] 19 [ ]

PATIENT NAME _____ DOB [ ] 19 [ ]

DIAGNOSTIC TESTS _____ DATE _____ UNIT _____ INVESTIGATION _____

_____ DATE _____ UNIT _____ INVESTIGATION _____

_____ DATE _____ UNIT _____ INVESTIGATION _____

CURRENT MEDICATION _____

REASON FOR REFERRAL

SIGNATURE _____

REFERRING GP NAME _____ CODE [ ]
BLOCK CAPITALS

PRACTICE STAMP

PRL 1

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APPENDIX Ic - PRL1 Half size

CLINICAL DETAILS

REFERRAL NO [ ] CONSULTANT _____ DATE [ ] 19 [ ]

PATIENT NAME _____ DOB [ ] 19 [ ]

DIAGNOSTIC TESTS _____ DATE _____ UNIT _____ INVESTIGATION _____

_____ DATE _____ UNIT _____ INVESTIGATION _____

_____ DATE _____ UNIT _____ INVESTIGATION _____

CURRENT MEDICATION _____

REASON FOR REFERRAL

SIGNATURE _____

REFERRING GP NAME _____ CODE [ ]
BLOCK CAPITALS

PRACTICE STAMP

PRL 1

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APPENDIX Id - GOS(S)(M) Half size

NHS GENERAL OPHTHALMIC SERVICES
PLEASE USE BLOCK CAPITALS EXCEPT FOR SIGNATURE

GOS(S)(M)
REFERRAL TO GENERAL MEDICAL PRACTITIONER

PART A – TO BE COMPLETED BY THE SIGHT TESTER AND SENT TO GENERAL MEDICAL PRACTITIONER

PATIENT'S DETAILS

SURNAME (Mr. Mrs. Miss. Ms)

DATE OF BIRTH (if under 19)

OTHER NAME(S)

DATE OF PREVIOUS SIGHT TEST

ADDRESS

PRESCRIPTION DETAILS FROM PREVIOUS SIGHT TEST

Uncorrected Vision	RIGHT					VA		Uncorrected Vision	LEFT					VA
	Sph	Cyl	Axis	Prism	Base				Sph	Cyl	Axis	Prism	Base	
							Distance							
							Reading							

PRESCRIPTION DETAILS FROM CURRENT SIGHT TEST DATE

							Distance							
							Reading							

I am of the opinion he she should be seen by yourself Ophthalmologist based on the following clinical findings.

Signature

Ophthalmic List No. Date

Name and Address of Sight Tester

THIS FORM SHOULD ACCOMPANY ANY REQUEST FOR HOSPITAL CONSULTATION.

NAME AND ADDRESS OF PATIENT'S GMP

FOR USE BY GENERAL MEDICAL PRACTITIONER

Signature

Medical List Ref No. Date

APPENDIX Ie - GOS(NI)M Half size

CENTRAL SERVICES AGENCY

GOS REFERRAL*/NOTIFICATION* FORM (*Delete as appropriate)

GOS (NI) M
(Oct. 1993)

To be completed by GOS Practitioner (part A), Patient (part B), and GM Practitioner (part C)

PATIENT'S NAME & ADDRESS

Name _____ Title _____

Address _____

_____

_____

Postcode _____ DOB _____

Tel.Home _____ Tel.Work _____

GOS PRACTITIONER

From

MEDICAL PRACTITIONER

To

PART A

PRESCRIPTION FROM PREVIOUS SIGHT TEST	RIGHT Vision	Sph	Cyl	Axis	Prism	Base	V/A		LEFT Vision	Sph	Cyl	Axis	Prism	Base	V/A
								Distance							
DATE: _____								Reading							
PRESCRIPTION FROM CURRENT SIGHT TEST:								Distance							
								Reading							
_____								Cycloplegic Results							

INFORMATION:

INTRAOCULAR PRESSURES	OPTIC DISCS	VISUAL FIELDS
Rt _____ mm Hg Lt _____ mm Hg	Rt _____ Lt _____	Rt _____ Lt _____
@ _____ am/pm @ _____ am/pm		_____ _____
TONOMETER		Field plot attached YES/NO

THIS PATIENT HAS BEEN ASKED TO:

- Make an appointment to see you ☐
- Report directly to hospital as an emergency case ☐

Optometrists Signature _____

List Number _____

Date _____

RECOMMENDED COURSE OF ACTION:

- Investigation/treatment by GP ☐
- Refer to Hospital Eye Department: ☐
- No action (information only) ☐

URGENCY RATING:

- ROUTINE ☐
- SOON ☐
- URGENT ☐

PART B - TO BE COMPLETED BY PATIENT

I agree/do not agree that any Ophthalmologist to whom I am referred for medical consultation or treatment may make information relevant to my eye condition and its treatment, available to my General Ophthalmic Services Practitioner.

Patients Signature _____

Date _____

PART C - BY GENERAL MEDICAL PRACTITIONER (when referring to Hospital Eye Department)

Tick if the patient is Diabetic ☐

Signature _____ Date: _____ Cypher No: _____ Fundholding Code: _____

White Copy for Ophthalmologist *Blue Copy for GP* *Pink Copy for Optometrist*

APPENDIX Ie - GOS(NI)M Half size

CENTRAL SERVICES AGENCY

GOS REFERRAL*/NOTIFICATION* FORM (*Delete as appropriate)

GOS (NI) M
(Oct. 1993)

To be completed by GOS Practitioner (part A), Patient (part B) and GM Practitioner (part C)

PATIENT'S NAME & ADDRESS

Name _____ Title _____

Address _____

_____

_____

Postcode _____ DOB _____

Tel.Home _____ Tel.Work _____

GOS PRACTITIONER

From

MEDICAL PRACTITIONER

To

PART A

	RIGHT								LEFT						
PRESCRIPTION FROM PREVIOUS SIGHT TEST	Vision	Sph	Cyl	Axis	Prism	Base	V/A		Vision	Sph	Cyl	Axis	Prism	Base	V/A
								Distance							
DATE: _____								Reading							
PRESCRIPTION FROM CURRENT SIGHT TEST:								Distance							
								Reading							
_____								Cycloplegic Results							

INFORMATION:

INTRAOCULAR PRESSURES	OPTIC DISCS	VISUAL FIELDS
Rt _____ mm Hg | Lt _____ mm Hg	Rt _____ | Lt _____	Rt _____ | Lt _____
@ _____ am/pm | @ _____ am/pm		_____ | _____
TONOMETER		Field plot attached YES/NO

THIS PATIENT HAS BEEN ASKED TO:

- Make an appointment to see you ☐
- Report directly to hospital as an emergency case ☐

Optometrists Signature _____

List Number _____

Date _____

RECOMMENDED COURSE OF ACTION:

- Investigation/treatment by GP ☐
- Refer to Hospital Eye Department: ☐
- No action (information only) ☐

URGENCY RATING:

- ROUTINE ☐
- SOON ☐
- URGENT ☐

PART B - TO BE COMPLETED BY PATIENT

I agree/do not agree that any Ophthalmologist to whom I am referred for medical consultation or treatment may make information relevant to my eye condition and its treatment, available to my General Ophthalmic Services Practitioner.

Patients Signature _____

Date _____

PART C - BY GENERAL MEDICAL PRACTITIONER (when referring to Hospital Eye Department)

Tick if the patient is Diabetic ☐

Signature _____ Date: _____ Cypher No: _____ Fundholding Code: _____

White Copy for Ophthalmologist *Blue Copy for GP* *Pink Copy for Optometrist*

APPENDIX Ie - GOS(NI)M Half size

CENTRAL SERVICES AGENCY

GOS REFERRAL*/NOTIFICATION* FORM *(Delete as appropriate)*

GOS (NI) M
(Oct. 1993)

To be completed by GOS Practitioner (part A), Patient (part B), and GM Practitioner (part C)

PATIENT'S NAME & ADDRESS

Name _____ Title _____

Address _____

Postcode _____ DOB _____

Tel.Home _____ Tel.Work _____

GOS PRACTITIONER

From

MEDICAL PRACTITIONER

To

PART A

	RIGHT								LEFT						
PRESCRIPTION FROM PREVIOUS SIGHT TEST	Vision	Sph	Cyl	Axis	Prism	Base	V/A		Vision	Sph	Cyl	Axis	Prism	Base	V/A
								Distance							
DATE: _____								Reading							
PRESCRIPTION FROM CURRENT SIGHT TEST:								Distance							
								Reading							
_____								Cycloplegic Results							

INFORMATION:

INTRAOCULAR PRESSURES	OPTIC DISCS	VISUAL FIELDS
Rt _____ mm Hg @ _____ am/pm	Rt _____	Rt _____
Lt _____ mm Hg @ _____ am/pm	Lt _____	Lt _____
TONOMETER		Field plot attached YES/NO

THIS PATIENT HAS BEEN ASKED TO:

- Make an appointment to see you ☐
- Report directly to hospital as an emergency case ☐

Optometrists Signature _____

List Number _____

Date _____

RECOMMENDED COURSE OF ACTION:

- Investigation/treatment by GP ☐
- Refer to Hospital Eye Department: ☐
- No action (information only) ☐

URGENCY RATING:

- ROUTINE ☐
- SOON ☐
- URGENT ☐

PART B - TO BE COMPLETED BY PATIENT

I agree/do not agree that any Ophthalmologist to whom I am referred for medical consultation or treatment may make information relevant to my eye condition and its treatment, available to my General Ophthalmic Services Practitioner.

Patients Signature _____

Date _____

PART C - BY GENERAL MEDICAL PRACTITIONER (when referring to Hospital Eye Department)

Tick if the patient is Diabetic ☐

Signature _____ Date: _____ Cypher No: _____ Fundholding Code: _____

White Copy for Ophthalmologist *Blue Copy for GP* *Pink Copy for Optometrist*

APPENDIX II

A Study of Referral Correspondence to MEH - Main Study Sample Size

The calculations take into account the results from the pilot study and are based on cataract referrals, the largest diagnosis group.

Sample Size : 400 referrals weekly for 24 weeks (9600 referrals)

GP

69% referrals are from the GP

9600x0.69=6624 GP referrals

From pilot study, cataract referrals make up 197/883=22.3%

$$s_{\bar{x}} = \sqrt{\frac{22.3 \ x \ 77.7}{6624}}$$
$$s_{\bar{x}} = 0.5$$

OO

26% referrals are from the OO

9600x0.26=2496 GP referrals

From pilot study, cataract referrals make up 110/362=30.4%

$$s_{\bar{x}} = \sqrt{\frac{30.4 \ x \ 69.6}{2496}}$$
$$s_{\bar{x}} = 0.9$$

OMP

2% referrals are from the OMP

9600x0.02=192 OMP referrals

From pilot study, cataract referrals make up 7/23=30.4%

$$s_{\bar{x}} = \sqrt{\frac{30.4 \ x \ 69.6}{192}}$$
$$s_{\bar{x}} = 3.3$$

Sample size required to reduce $s_{\bar{x}}$:

$$N = \frac{30.4 \ x \ 69.6}{2^2}$$
$$N = 528$$

Too few referrals are received from OMPs to make detailed analysis possible.

APPENDIX III - DATAEASE™ DATA COLLECTION FORM

PCC & CEB REFERRALS

Date: 07/09/95

Px no: _____ Clinic: ___

Px Referred By: _____ _____ _____ Fundholder: ___

Referral Required: ___

Letter: _____ _____ _____ Postcode: ____

1st cons. __/__/__ 2nd cons. __/__/__ letter MEH: __/__/__ Appt: __/__/__

Sex: _____ D of B: __/__/__ Age: ___

Diagnosis: _____ _____ _____

Symptoms: _____ _____ _____

Service: _____ _____ Fellow Eye: _____

Old Px?: ___ Previous appts: _____

GOH: _____ GH: _____ PMH: _____ Med: _____ Urgency: _____ FH: _____

MedPres: _____ Ons/Dur: _____ Clens: _____ Allergy: _____ Trans: _____

Tests: _____ _____ _____ _____ _____ _____ _____ _____
_____ Outcome: ___

Notes: _____

Dummy Variable: _ Score: _

Appendix IV

Testing the Assumption that unidentified Ophthalmic Referrals were OO Initiated

Method

During 2 data collection weeks in June/July (14th to 18th June and 28th to 2nd July) all referrals from Ophthalmic Practitioners where the individual practitioner was not clearly identified as an OO,OMP or DO were recorded. The practices were then contacted by telephone.

Results

Ophthalmic Practitioner Initiated	Number of Referrals
OO	57
OMP	4
DO	1
Letter not included by GP	23
Ophthalmic Practitioner not identified	16

16 Optical Practices were contacted by telephone. 1 practice was unable to find the patient's notes and could not confirm the referring practitioner. The other 15 referrals were identified as OO initiated.

Conclusions

During the two week data collection period 92% referrals Ophthalmic Practitioner referrals were OO initiated. Therefore, 92 out of 100 would be correctly identified. This small sample, where the practitioner had not identified himself/herself, were all OO referrals. It may be that OOs rather than OMPs and DOs are less likely to identify themselves on the referral correspondence.

This small studied showed that the assumption used in the main referral study appeared reasonable.

APPENDIX V

Diagnosis Scoring

Diagnosis Classification	Included Details	Score
Cataract	VA Distance	1
(Mr R Daniel)	VA Near	1
	Symptoms	1
	Lens evaluation - cataract location or type	1
	Ocular History (ocular accident)	1
	General Health	1
	Relevant Medication	1
	VA Change	1
	TOTAL	8
Glaucoma	Family History	1
(Mr R Hitchings)	IOP	1
	Fields	2
	Optic Disc	1
	Ocular History or symptoms "haloes"	1
	A/C assessment (CAG)	1
	TOTAL	7
External Eye	Symptoms	1
(Mr J Dart)	Location	1
	Onset/duration	2
	Size/severity	1
	TOTAL	5
(For cornea only)	visual deterioration	1
	contact lens wearer	1
	corneal ulceration	1
	TOTAL	8
Maculopathy	VA distance, P/H or Rx	1

Diagnosis Classification	Included Details	Score
(Mr R J Cooling)	VA near	2
	Fundus	1
	Amsler	2
	Fellow Eye	1
	Symptoms - visual distortion	1
	Macular examination findings	2
	Pupils	1
	Duration/onset	2
	TOTAL	13
Binocular Vision	VA	1
(Mr J Lee)	age	1
	family history	1
	symptoms	1
	onset	1
	Ocular history	2
	GMH	1
	TOTAL	8

Appendix VI

Consultant Ophthalmologists at The Birmingham and Midland Eye Hospital

Consultant	Qualification	Speciality*
EAGLING, Elizabeth	MB BS Lond 1965 FRCS 1973 FCOphth 1988	ocular trauma
FIELDER, Alistair	MB BS Lond 1966 FRCS 1975 FCOphth 1988	paediatric ophthalmology
KIRKBY, Graham	MB BS Newc 1975 FRCS 1980 FCOphth 1988	sugical retina
KRITZINGER, Erna	MB ChB Birm 1974 FRCS 1979 FCOphth 1988 FRCP Lond 1990	medical retina
MCDONNELL, Peter	MB BS Lond 1978 FRCS 1983 MRCP 1981	cornea and cataract
MURRAY, Philip	MB BS 1978 FRCS 1985 FCOphth 1988 PhD 1990	uveitis
O'NEILL, Eamon		glaucoma
SUTTON, George	MB BCh BAO NUI 1967 FRCS 1977 FCOphth 1989	adnexal and cataract surgery

*** The Medical Directory, 1995**

APPENDIX VII- DATAEASE™ BMEH DATA COLLECTION FORM

BIRMINGHAM AND MIDLAND EYE HOSPITAL STUDY

Date: 08/09/95 Legibility: ____ ____ Designated: ___

Px no: _____

Px Referred By: _____ _____ _____ Fund Hold: ___

Referral Required: ___

Letter: _____ _____ _____ Postcode: ___

1st cons. __/__/__ 2nd cons. __/__/__ letter BMEH: __/__/__ Appt: __/__/__

Sex: _____D of B: __/__/__ ___ ___ Age: ___ Interval: ____ ____ ___ ___

Diagnosis: _____ _____ _____

Symptoms: _____ _____ _____

Specialist Clinic: ____ ____ Fellow Eye: _____

Old Px?: ___ Previous appts: _____

GOH: _____ GH: _____ PMH: _____ Med: _____ Urgency: _____ FH: _____

MedPres: _____ Ons/Dur: _____ Clens: _____ Allergy: _____ Trans: _____

Tests: _____ _____ _____ _____ _____ _____ _____ _____ _____

Outcome: ___

Dummy Variable: _ Score: _

APPENDIX V111

QUESTIONNAIRE

We are investigating the eye care you received prior to attending Moorfields Eye Hospital. Please attempt as many questions as possible, but do not hesitate to ask if you are unsure. By filling in this questionnaire, you are helping us to improve the services we provide.

All information that you provide will be dealt with in strict confidence.

1. Who did you consult about the problem with your eyes before coming to Moorfields Eye Hospital today?

(If there was more than one person then please mark the boxes with number ie. No.1 being the first person that you consulted, No.2 the second etc.

Doctor	
Optician	
School Nurse	
Nurse/Doctor at work	
Hospital Doctor	

Other (please specify) _____

2. Who was the first person who referred you because of this problem with your eyes?

Doctor	
Optician	
School Nurse	
Nurse/Doctor at work	

Other (please specify) _____

3. From which address did you travel here this morning?

(There is no need to state the house number)

_____

_____Postcode_____

4. How long has it taken you to travel here today?

☐ Hours ☐ Minutes

5. How did you arrive here today?

- Private Car ☐
- Hospital Transport ☐
- Taxi ☐
- Train (British Rail) ☐
- Underground ☐
- Bus ☐
- Walked ☐
- Cycled ☐

Other (Please specify) _____

6a. If you travelled by public transport (bus, train, underground) or taxi, did you already have a season ticket to cover the cost of your journey?

- Yes ☐ Go to Question 8.
- No ☐

6b. How much did your journey cost?_____

7. Why were you sent to Moorfields as opposed to another eye hospital?

- GP advised ☐
- Near to where you live ☐
- Near to where you work ☐
- Your request ☐
- Don't know ☐

Other (please specify) _____

8. Approximately, how often do you visit an optician for an eye examination?

Never	☐
More frequently than once a year	☐
Between 1 to 2 years	☐
Between 3 to 5 years	☐
Less frequently than every 5 years	☐

9. Please make any comments you may have about the eye care that you received before arriving here today.

_____

_____

_____

10. Your hospital number: _____

11. Occupation of head of your household: _____

THANKYOU VERY MUCH FOR YOUR TIME

APPENDIX IX - CAPI FORM - DATAEASE ™

CAPI FORM (PCC)

Date: 08/09/95 Hospital No: _____ Sex: _ Age: __

Referee: _____ _____ _____ Notes: _____

If Eye Exam, why did patient attend? _____

==========

Postcode travelled from today: ____

Journey time: ___Mins

Transport: _____ _____ _____

If bus/train/underground did season ticket cover journey?: ___

Journey Cost (single fare): ___.__

==========

Why MEH as opposed to other hospital: _____ _____

Occupation Head of Household: _____ SocEco: _____

How often do you visit optician for eye examination?: _____

Comments on Eye Care: _____

Dummy Variable: _

APPENDIX X - CAPI FORM (CEB)- DATAEASE ™

CAPI FORM (CEB)

Date: 08/09/95 Hospital No: _____ Age:___ Sex: _

Referree: _____ _____ _____ Notes: _____

If Eye Examination, why attend? _____

Did GMP look in eyes?: ___

Time intervals: OO-GMP ___ Explain _____

==========

Postcode travelled from today: ____

Journey time: __Mins

Transport: _____ _____ _____

If bus/train/underground did season ticket cover journey?: ___

Journey Cost (if above no) single fare: ___.__

==========

Has Px attended MEH before: ___

Why MEH as opposed to other hospital: _____ _____

Comments on Bow aot MEH: _____

Occupation of Head of the Household: _____

How often do you visit optician for eye examination?: _____

Comments on Eye Care: _____

Dummy Variable: _

==========

APPENDIX XI

Questionnaire

Please circle (eg 1) the number which you feel best represents your strength of agreement or disagreement with the following statements.

1 means you definitely agree
2 means you agree
3 means that you neither agree nor disagree
4 means you disagree
5 means you definitely disagree

1.It was more convenient for me to attend the Bow clinic at St. Andrews than the main Moorfields Eye Hospital	1	2	3	4	5
2.I have always been provided with enough information about when and where I must attend for appointments.	1	2	3	4	5
3.Being seen at Bow initially was pointless as other examinations were later carried out at the main hospital.	1	2	3	4	5
4.I waited too long to be seen initially after being referred by my doctor.	1	2	3	4	5
5.I did not have to wait long between the assessment at Bow and my follow up at the main hospital.	1	2	3	4	5
6.Being seen at a convenient local clinic for an initial assessment is a good idea.	1	2	3	4	5
7.I would rather have been seen at another eye hospital in London.	1	2	3	4	5
8.I was well informed about why I was being referred by my doctor before he contacted Moorfields.	1	2	3	4	5
9.As London has plenty of public transport, community clinics are not needed.	1	2	3	4	5
10.I was happy with my first assessment at the Bow clinic.	1	2	3	4	5
11.I feel that having my eyes examined regularly by an optician is very important.	1	2	3	4	5

MEH HEADED PAPER

February 28, 1994

Dear _____

In September 1993, you attended the community based clinic of Moorfields Eye Hospital at St Andrews, Bow.

You very kindly answered my questions regarding the referral process and your opinions of the clinic.

Now that you have been seen at both the Bow clinic and our main hospital at City Road, your views would again be very useful to us.

Please would you be kind enough to complete the enclosed questionnaire and return it in the enclosed stamped addressed envelope.

Your replies will remain strictly confidential and will in no way affect any future dealings that you may with our hospital.

Thankyou very much for your time.

Yours sincerely

Mrs Janet Pooley

Research Optometrist, Primary Care Clinic (Bow).

Appendix XII The Ophthalmic Referral Process

Please note that all your replies will remain anonymous

1. How many available eye examinations appointments do you usually have each day ?

_____

2. How many days each week do you practise?

_____

3. What length of appointment time do you book for each patient?

_____

4. Do you carry out additional tests within the eye examination which you know are not relevant for a particular patient just because you feel that you need to cover yourself incase of a negligence claim?

- [ ] Often †
- [ ] Occasionally
- [ ] Rarely
- [ ] Never

The non-urgent referral

5. What type of correspondence do you most often use when referring a patient to their own doctor?

- [ ] GOS18 †
- [ ] Handwritten Letter
- [ ] Typed Letter
- [ ] Company or self-styled referral form
- [ ] Other (please specify)_____

P.T.O.

6. How does your referral letter usually get to the doctor's surgery?

- [ ] Handed to patient at the end of the appointment †
- [ ] Handed to the patient at a later date
- [ ] Posted to the doctors surgery
- [ ] Posted to the patient
- [ ] Other (please specify)_____

7. Why do you use the above method?

_____

8. How often do you receive correspondence directly from the patients doctor following your referral?

Very frequently Not at all

1 2 3 4 5 6 7 **

** Please circle the most appropriate scale number

9. If you think you know what the diagnosis is, would you specify it in the referral letter?

YES/NO*

10. In a referral for a condition that you feel should be dealt with by the Hospital Eye Service (HES), do you request that the patient is referred to a hospital?

YES/NO*

11. Do you ever recommend a particular hospital or department which you feel would be most appropriate for your referred patient? YES/NO*

The Urgent Referral

12. If you feel a patient requires urgent ophthalmic treatment would you refer your patient.....

- [ ] directly to an accident and emergency department(A&E) †
- [ ] via their GP requesting urgent referral
- [ ] Other (please specify)_____

13. Do you ever telephone the hospital prior to the referral? YES/NO*

If YES, under what circumstances?

_____

_____

14. Do you write to the patients doctor following a referral to A&E?

	Always †
	Occasionally
	Rarely
	Never

15. Which type of correspondence do you use to send a patient to A&E?

	GOS18 †
	Handwritten Letter
	Typed Letter
	Company or self-styled referral form
	Other (please specify)_____

16. Do you ever refer patients directly to the HES other than in an emergency? YES/NO*

If YES, under what circumstances?

_____

_____

The new GOS18

17. Are you aware of the new version of the GOS18?

YES/NO*

(If NO please go to question 24) P.T.O

18. What is your opinion of the new form ?

_____

_____

19. Have you used it ? YES/NO*

(If NO please go to question 24)

20. Do you ask patients to sign to give permission for you to receive information regarding the outcome of the referral? YES/NO/SOMETIMES*

21. Has any patient ever refused to sign to give this permission? YES/NO*

22. Please give any comments that you may have about this part of the form

_____

23. Have you noticed that this version of the GOS18 has made a difference to the number of replies to referrals that you have received?

- [ ] More Replies †
- [ ] Unaware of any change in replies received
- [ ] Less Replies

The British College of Optometrists

24. Are you a member or fellow of the British College of Optometrists (BCO)? YES/NO*

25. Have you read the BCO guidelines on referral? YES/NO*

Direct Referral for non-urgent patients

26. How would you feel about referring patients directly to the HES?

_____

_____

27. Financial constraints aside, do you feel that patients may benefit from a direct referral from yourself to the HES for non-urgent ophthalmic problems?

- [ ] Always †
- [ ] Often
- [ ] Sometimes
- [ ] Never

28. Are there any particular groups of patients that you feel would benefit from direct referral?
(Please tick as many as you feel apply)

- [ ] All patients who you feel require hospital care
- [ ] Glaucoma suspects
- [ ] Diabetic retinopathy
- [ ] Cataracts
- [ ] Orthoptic cases
- [ ] Maculopathy
- [ ] BD8 registration/low vision aid patients
- [ ] No patients would benefit

Other (please specify) : _____

29. Please state any further comments you may have regarding the ophthalmic referral system.

_____

Personal Details

30. What year did you qualify to be an optometrist?

_____

31. Which sex are you?

- [ ] Male†
- [ ] Female

P.T.O.

32. What type of practice do you usually work in?

- [ ] Multiple †
- [ ] Independent

33. In what county do you usually practise?

_____

34. At which University/College did you train?

_____

† Please tick the most appropriate box

* Please delete as appropriate

APPENDIX XIII - GP Questionnaire

THE REFERRAL PROCESS

Please note that this questionnaire refers to two categories of letters received from the optometrist: inform only letters eg letters about diabetics/glaucoma patients, very early cataracts, and also referral letters.

1. Approximately how many letters from optometrists do you receive each week?

Information Only _____

Referrals_____

2. The GOS 18 has just been updated. It is no longer green, but comprises self carbonating pages. Have you seen one of the new designs? YES/NO*

If YES, please give your comments on the new form

_____

3. Do you sometimes feel that referring a patient on to the Hospital Eye Service (HES) that has been referred to you by an optometrist is just an administration task?

	Always
	Often
	Sometimes
	Never **

4. Do you ever fill in the GP section on an optometrist referral form, or do you write your own letter?

	Always fill in form
	Sometimes fill in form, sometimes own correspondence
	Always write own correspondence **

5. What is your opinion on the standard of the referrals that you receive from local optometrists?

very good very poor

1 2 3 4 5 6 7 *

* Please circle the most appropriate scale number which expresses your strength of feeling.

6. Do you ever refer patients to the optometrist?

YES/NO*

7. Eye examinations are no longer free of charge for everyone. Have you referred patients to the HES, who you would previously have referred to a local optometrist?

YES/NO*

8. How do you feel about patients having to pay for eye examinations now?

agree strongly disagree strongly

1 2 3 4 5 6 7 *

* Please circle the most appropriate scale number which expresses your strength of feeling.

9. In some referral cases, there is a long delay between the date on the referral letter from the optometrist and the date of the GP letter. Can you give any reasons, in your own experience, why this may occur?

_____

_____

_____

10. What proportion of the **referral** letters received from Optometrists do you **not** refer on to the HES?

_____

11. In what percentage of cases do you refer a patient to the HES, previously referred to you by their optometrist, and **not** include the optometrists referral letter?

_____

12. Do you sometimes refer a patient to the HES even though you do not feel it is necessary, just because the optometrist has advised referral? YES/NO*

13. Optometrists refer urgent ophthalmic cases directly to the casualty department. Financial constraints aside, do you feel that patients may benefit from a direct referral from the optometrist to the HES for non-urgent ophthalmic problems?

	Always
	Often
	Sometimes
	Never **

16. Do you ever inform the optometrist, who initiated the referral, of the outcome?

YES/NO*

17. Optometrist are now required to write and inform the patients GP when they are examining a patient who is a known sufferer of diabetes or glaucoma. This is a legal requirement. Do you find this information useful?

	Always
	Often
	Sometimes
	Never **

18. Would you find it more useful if the optometrist was only to inform you if there was a change detected in the condition of a diabetic or glaucoma patient?

YES/NO*

19. Are you happy with the correspondence that you receive from the Primary Care Clinic at Moorfields? YES/NO*

20. Are there any ways that our correspondence may be improved?

_____

_____

21. What year did you qualify to practice medicine?

_____

22. Where do you practice? (Please give the postcode only).

_____

** Please tick the appropriate box.

THANKYOU VERY MUCH FOR YOUR TIME

Appendix XIVa - Adult Control Questionnaire

PLEASE ANSWER ALL THE QUESTIONS AND COMPLETE IN BLOCK CAPITALS

1. How long before the day of your appointment did you receive details of the appointment?

_____ weeks _____ days

2. Were you aware that there was a problem with your eyes before you were referred? YES/NO*

3. Who was the **first** professional who felt that your eye condition needed further attention and referred you?

(Please tick the appropriate box)

Doctor.....	☐
Optician.....	☐
School Nurse.....	☐
Nurse/Doctor at work.....	☐

Other (Please specify)_____

4. Were you, at any time, suffering from any symptoms associated with the condition which were referred for? YES/NO*

5. Did you request to be seen at Moorfields? YES/NO*

6. Would you attend for an appointment if you were referred to Moorfields Eye Hospital in the future? YES/NO*

7. Did you require an interpreter to attend the appointment with you? YES/NO*

8. Did you need someone to accompany you to the appointment? YES/NO*

9. Have you ever failed to attend any hospital appointment in the past? YES/NO*

* Delete as appropriate

THANKYOU VERY MUCH FOR YOUR ASSISTANCE

APPENDIX XIVb Adult DNA Questionnaire

PLEASE COMPLETE IN BLOCK CAPITALS

1. Approximately, on what date did you receive the appointment to attend Moorfields Eye Hospital?

_____

2. Were you aware that there was a problem with your eyes before you were referred? YES/NO*

3. Are you aware of the reason for your referral to have your eyes examined? YES/NO*

If you answered YES please give details?

_____

_____

4. Did you request to be seen at Moorfields?

YES/NO*

5. What were the reasons that you were unable to attend for your appointment?

_____

_____

6. Would you attend for an appointment if you were referred to Moorfields Eye Hospital in the future?

YES/NO*

If you answered NO, Why not?

_____

_____

7. Have you been to another eye department or casualty department to have this eye condition dealt with?

YES/NO*

If you answered YES please give details?

Hospital: _____

Department: _____

Date seen: _____

8. Are you currently in paid employment? YES/NO*

9. Please describe your current or most recent occupation and give <u>title</u> eg 'accounts clerk' rather than 'clerk'.

_____

_____

10. What were the main tasks that you actually do or did in your job?

_____

_____

* Delete as appropriate

If you require a further appointment then please contact you own doctor.

Appendix XIVc - Example of Accompanying Letter

MEH headed paper

Dear _____

The hospital is conducting a study relating to appointment attendances. Our records show that you failed to attend for an appointment in Community Eye Clinic at St Andrews Hospital, Bow:

_____.

Please would you be kind enough to complete the enclosed questionnaire, which should only take a few minutes, and return it in the stamped addressed envelope. Your answers will be very useful in helping us to allocate appointments in the future.

Any answers you give will be treated in strictest confidence and will in no way affect any future dealings you may have with our hospital. Thankyou very much for your time.

Yours sincerely

Mrs Janet E Pooley
PCC Research Optometrist

Appendix XIVd
Example of Accompanying Letter to Child (DNA CEB)

Headed Paper

April 22, 1994

Dear _____

An appointment was sent to _____to attend the Moorfields Community Eye Clinic at St Andrew's Hospital, Bow on _____ at _____ .

We are interested to establish why he/she was unable to attend in order that we may improve our efficiency. Please assist us by completing the enclosed questionnaire on behalf of your child.

Any answers you give will be treated in strictest confidence and will in no way affect any future dealings your family may have with our hospital. All your responses will remain anonymous.

Thankyou very much for your assistance.

Yours sincerely

Mrs Janet E Pooley Bsc(Hons) MCOptom
Research Optometrist PCC

Appendix XIVe
Example of First Reminder Letter

Headed Paper

June 10, 1994

Dear _____

I have written to you previously regarding your failure to attend the Moorfields Eye Clinic at St Andrews Hospital, Bow on _____ at _____ . It is important that we establish why you were unable to attend in order that we may improve our efficiency. Please will you complete the questionnaire which was sent and return it to the hospital as soon as possible.

If you have any queries regarding filling in the questionnaire please note them on the form, with your daytime phone number, and I will be happy to contact you.

Any answers you give will be treated in strictest confidence and will in no way affect any future dealings you may have with our hospital.

Thankyou very much for your assistance.

Yours sincerely

Mrs Janet E Pooley Bsc(Hons) MCOptom
Research Optometrist PCC

APPENDIX XV - DISCRIMINANT ANALYSIS

On groups defined by TYPE

274 (Unweighted) cases were processed.
97 of these were excluded from the analysis.
97 had at least one missing discriminating variable.
177 (Unweighted) cases will be used in the analysis.

Number of cases by group

TYPE	Number of cases Unweighted	Weighted	Label
1	110	110.0	
2	67	67.0	
Total	177	177.0	

KEY

1 = Control
2 = DNA

Group means

TYPE	AGE	ACCOMP	AWARE	EMPLOY
1	56.64545	1.60000	1.15455	1.65455
2	46.31343	1.67164	1.10448	1.43284
Total	52.73446	1.62712	1.13559	1.57062

TYPE	SEX	FUTURE	INTERP	MARITAL
1	1.60000	1.03636	1.88182	2.18182
2	1.52239	1.02985	1.88060	2.19403
Total	1.57062	1.03390	1.88136	2.18644

TYPE	REFEREE
1	1.48182
2	1.53731
Total	1.50282

Group standard deviations

TYPE	AGE	ACCOMP	AWARE	EMPLOY
1	21.98064	.49214	.36313	.47769
2	23.33304	.47316	.30819	.49921
Total	22.99216	.48494	.34333	.49639

TYPE	SEX	FUTURE	INTERP	MARITAL
1	.49214	.18805	.32430	1.43471
2	.50327	.17146	.32671	1.55932
Total	.49639	.18148	.32429	1.47873

TYPE	REFEREE
1	.60171
2	.85962
Total	.70810

Wilks' Lambda (U-statistic) and univariate F-ratio
with 1 and 175 degrees of freedom

Variable	Wilks' Lambda	F	Significance
AGE	.95223	8.7799	.0035
ACCOMP	.99484	.9083	.3419
AWARE	.99497	.8849	.3482
EMPLOY	.95280	8.6683	.0037
SEX	.99422	1.0180	.3144
FUTURE	.99970	.0533	.8176
INTERP	1.00000	.0006	.9807
MARITAL	.99998	.0028	.9577
REFEREE	.99855	.2547	.6144

Analysis number 1

Direct method: all variables passing the tolerance test are entered.

Minimum tolerance level..... .00100

Canonical Discriminant Functions

Maximum number of functions..... 1
Minimum cumulative percent of variance... 100.00
Maximum significance of Wilks' Lambda.... 1.0000

Prior probability for each group is .50000

Canonical Discriminant Functions

Fcn	Eigenvalue	Pct of Variance	Cum Pct	Canonical Corr	After Fcn	Wilks' Lambda	Chi-square	df	Sig
				:	0	.923695	13.533	9	.1399
1*	.0826	100.00	100.00	.2762 :					

* Marks the 1 canonical discriminant functions remaining in the analysis.

Standardized canonical discriminant function coefficients

	Func 1
AGE	.58733
ACCOMP	-.09290
AWARE	.30274
EMPLOY	.51009
SEX	.07224
FUTURE	.09600
INTERP	.12416
MARITAL	.17826
REFEREE	-.19442

Structure matrix:

Pooled within-groups correlations between discriminating variables and canonical discriminant functions
(Variables ordered by size of correlation within function)

	Func 1
AGE	.77932
EMPLOY	.77435
SEX	.26536
ACCOMP	-.25066
AWARE	.24741
REFEREE	-.13273
FUTURE	.06074
MARITAL	-.01398
INTERP	.00637

Canonical discriminant functions evaluated at group means (group centroids)

Group	Func 1
1	.22304
2	-.36619

Case Number	Mis Val	Sel	Actual Group		Highest Group	Probability P(D/G)	P(G/D)	2nd Highest Group	P(G/D)	Discrim Scores
1			1	**	2	.0379	.8016	1	.1984	-2.4417
2			1		1	.7786	.5840	2	.4160	.5042
3			1	**	2	.6914	.6005	1	.3995	-.7631
4			1	**	2	.3031	.6858	1	.3142	-1.3960
5			1	**	2	.6709	.6044	1	.3956	-.7911
6			1	**	2	.2542	.6996	1	.3004	-1.5064
7			1		1	.4764	.6441	2	.3559	.9351
8			1	**	2	.2970	.6874	1	.3126	-1.4091
9			1		1	.1214	.7477	2	.2523	1.7719
10			1	**	2	.3492	.6738	1	.3262	-1.3024
11			1	**	2	.6914	.6005	1	.3995	-.7631
12			1	**	2	.1829	.7228	1	.2772	-1.6981
13			1		1	.2772	.6929	2	.3071	1.3097
14			1		1	.1900	.7203	2	.2797	1.5336
15			1		1	.0383	.8013	2	.1987	2.2945
16			1	**	2	.7943	.5050	1	.4950	-.1055
17			1		1	.4526	.6493	2	.3507	.9741
18			1	**	2	.7401	.5912	1	.4088	-.6980
19			1		1	.8969	.5622	2	.4378	.3526
20			1		1	.5788	.6226	2	.3774	.7782
21			1		1	.7063	.5976	2	.4024	.5999
22			1		1	.8433	.5720	2	.4280	.4207
23			1	**	2	.6478	.6089	1	.3911	-.8230
24			1	**	2	.5026	.6384	1	.3616	-1.0365
25			1		1	.9598	.5359	2	.4641	.1726
26			1		1	.0972	.7597	2	.2403	1.8817
27			1		1	.4697	.6456	2	.3544	.9459
28			1		1	.4449	.6511	2	.3489	.9870
29			1	**	2	.8480	.5152	1	.4848	-.1745
30			1	**	2	.6667	.6052	1	.3948	-.7969
31			1	**	2	.5888	.6206	1	.3794	-.9068
32			1		1	.7492	.5895	2	.4105	.5427
33			1	**	2	.3394	.6762	1	.3238	-1.3216
34			1	**	2	.5557	.6273	1	.3727	-.9555
35			1		1	.2001	.7168	2	.2832	1.5043
36			1	**	2	.6899	.6008	1	.3992	-.7652
37			1		1	.8716	.5196	2	.4804	.0614
38			1	**	2	.8702	.5193	1	.4807	-.2028
39			1		1	.5011	.6388	2	.3612	.8958
40			1		1	.2894	.6895	2	.3105	1.2825
41			1		1	.6579	.6069	2	.3931	.6658
42			1		1	.7192	.5952	2	.4048	.5825
43			1		1	.3586	.6714	2	.3286	1.1411
44			1		1	.3950	.6626	2	.3374	1.0737
45			1		1	.7611	.5873	2	.4127	.5270
46			1	**	2	.1903	.7202	1	.2798	-1.6760
47			1	**	2	.9156	.5278	1	.4722	-.2602
48			1		1	.6392	.6106	2	.3894	.6919
49			1		1	.1402	.7394	2	.2606	1.6981

Case Number	Mis Val	Sel	Actual Group		Highest Group	Probability P(D/G)	P(G/D)	2nd Highest Group	P(G/D)	Discrim Scores
50			1		1	.8683	.5674	2	.4326	.3889
51			1	**	2	.6439	.6097	1	.3903	-.8285
52			1	**	2	.9108	.5269	1	.4731	-.2542
53			1		1	.4383	.6526	2	.3474	.9981
54			1	**	2	.8412	.5139	1	.4861	-.1659
55			1	**	2	.6439	.6097	1	.3903	-.8285
56			1	**	2	.9042	.5257	1	.4743	-.2459
57			1	**	2	.8815	.5650	1	.4350	-.5152
58			1		1	.3813	.6659	2	.3341	1.0986
59			1	**	2	.2697	.6951	1	.3049	-1.4700
60			1	**	2	.8023	.5065	1	.4935	-.1158
61			1		1	.4451	.6510	2	.3490	.9866
62			1		1	.3014	.6862	2	.3138	1.2564
63			1	**	2	.6382	.6108	1	.3892	-.8363
64			1		1	.6870	.6013	2	.3987	.6260
65			1		1	.3315	.6783	2	.3217	1.1942
66			1		1	.5421	.6301	2	.3699	.8327
67			1		1	.2701	.6950	2	.3050	1.3259
68			1		1	.9290	.5563	2	.4437	.3122
69			1		1	.8705	.5194	2	.4806	.0600
70			1		1	.1108	.7527	2	.2473	1.8175
71			1		1	.3374	.6767	2	.3233	1.1823
72			1		1	.6058	.6172	2	.3828	.7392
73			1		1	.9992	.5434	2	.4566	.2241
74			1		1	.3784	.6666	2	.3334	1.1039
75			1	**	2	.6518	.6081	1	.3919	-.8174
76			1	**	2	.8360	.5129	1	.4871	-.1592
77			1		1	.6505	.6084	2	.3916	.6761
78			1		1	.6895	.6009	2	.3991	.6226
79			1	**	2	.8514	.5705	1	.4295	-.5535
80			1	**	2	.1805	.7237	1	.2763	-1.7055
81			1		1	.6303	.6123	2	.3877	.7043
82			1		1	.4898	.6412	2	.3588	.9137
83			1		1	.6081	.6168	2	.3832	.7359
84			1	**	2	.2901	.6893	1	.3107	-1.4241
85			1		1	.7371	.5918	2	.4082	.5587
86			1	**	2	.4474	.6505	1	.3495	-1.1259
87			1		1	.3410	.6758	2	.3242	1.1753
88			1		1	.5042	.6381	2	.3619	.8910
89			1		1	.9509	.5523	2	.4477	.2846
90			1		1	.4144	.6580	2	.3420	1.0393
91			1	**	2	.7810	.5836	1	.4164	-.6442
92			1		1	.2663	.6961	2	.3039	1.3347
93			1	**	2	.2024	.7160	1	.2840	-1.6411
94			1		1	.3282	.6791	2	.3209	1.2008
95			1		1	.5877	.6208	2	.3792	.7653
96			1		1	.7712	.5006	2	.4994	-.0677
97			1		1	.5968	.6190	2	.3810	.7521
98			1		1	.4945	.6402	2	.3598	.9062

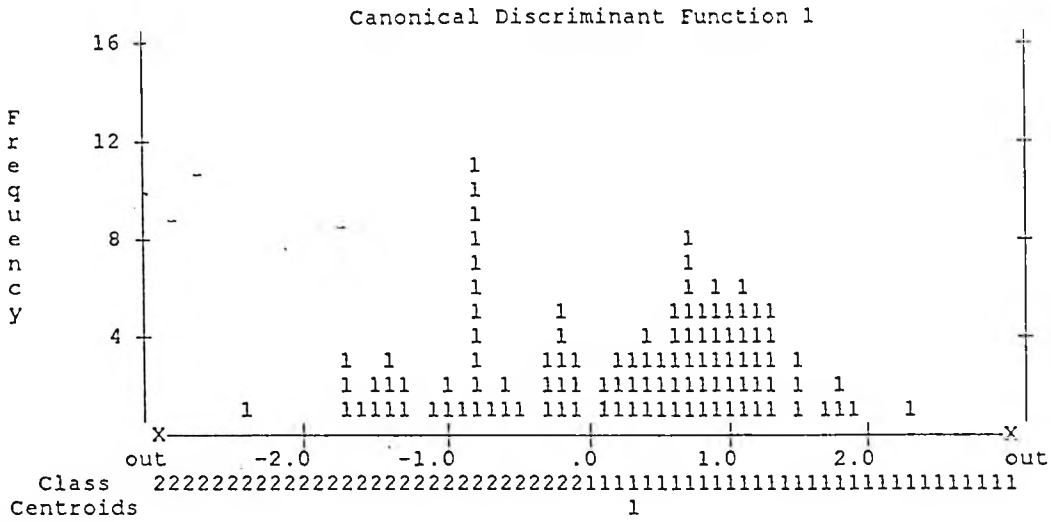
Case Number	Mis Val	Sel	Actual Group		Highest Group	Probability P(D/G)	P(G/D)	2nd Highest Group	P(G/D)	Discrim Scores
99			1		1	.2012	.7164	2	.2836	1.5012
100			1	**	2	.6444	.6096	1	.3904	-.8277
101			1		1	.6694	.6047	2	.3953	.6500
102			1		1	.5407	.6304	2	.3696	.8348
103			1		1	.3197	.6813	2	.3187	1.2181
104			1		1	.3572	.6717	2	.3283	1.1437
105			2	**	1	.5192	.6349	2	.3651	.8676
106			2	**	1	.2828	.6913	2	.3087	1.2970
107			2		2	.9246	.5571	1	.4429	-.4608
108			2	**	1	.4346	.6534	2	.3466	1.0044
109			2	-	2	.3898	.6638	1	.3362	-1.2263
110			2		2	.3092	.6841	1	.3159	-1.3830
111			2		2	.7485	.5897	1	.4103	-.6869
112			2	**	1	.7357	.5921	2	.4079	.5606
113			2	**	1	.7073	.5975	2	.4025	.5986
114			2		2	.5246	.6338	1	.3662	-1.0024
115			2		2	.7309	.5930	1	.4070	-.7101
116			2		2	.1764	.7251	1	.2749	-1.7180
117			2		2	.1704	.7274	1	.2726	-1.7372
118			2		2	.4228	.6561	1	.3439	-1.1678
119			2		2	.4656	.6465	1	.3535	-1.0959
120			2		2	.4956	.6399	1	.3601	-1.0476
121			2	**	1	.9493	.5526	2	.4474	.2866
122			2		2	.5177	.6352	1	.3648	-1.0131
123			2		2	.3639	.6701	1	.3299	-1.2741
124			2		2	.7610	.5873	1	.4127	-.6703
125			2		2	.6804	.6026	1	.3974	-.7781
126			2		2	.5433	.6299	1	.3701	-.9740
127			2		2	.3609	.6708	1	.3292	-1.2798
128			2		2	.8740	.5664	1	.4336	-.5248
129			2		2	.3003	.6865	1	.3135	-1.4020
130			2		2	.3383	.6765	1	.3235	-1.3237
131			2	**	1	.8784	.5656	2	.4344	.3760
132			2		2	.3513	.6732	1	.3268	-1.2983
133			2		2	.7842	.5031	1	.4969	-.0923
134			2	**	1	.6615	.6062	2	.3938	.6609
135			2		2	.5433	.6299	1	.3701	-.9740
136			2		2	.4649	.6466	1	.3534	-1.0969
137			2		2	.7343	.5923	1	.4077	-.7056
138			2		2	.0596	.7831	1	.2169	-2.2500
139			2		2	.4217	.6563	1	.3437	-1.1697
140			2		2	.3733	.6678	1	.3322	-1.2564
141			2		2	.9990	.5431	1	.4569	-.3650
142			2	**	1	.0477	.7925	2	.2075	2.2031
143			2		2	.3436	.6752	1	.3248	-1.3133
144			2		2	.2811	.6918	1	.3082	-1.4440
145			2		2	.8770	.5206	1	.4794	-.2114
146			2	**	1	.2335	.7059	2	.2941	1.4144
147			2		2	.9688	.5376	1	.4624	-.3270

Case Number	Mis Val	Sel	Actual Group		Highest Group	Probability P(D/G)	P(G/D)	2nd Highest Group	P(G/D)	Discrim Scores
148			2		2	.9895	.5414	1	.4586	-.3530
149			2	**	1	.4985	.6393	2	.3607	.9000
150			2	**	1	.3309	.6784	2	.3216	1.1954
151			2		2	.4042	.6604	1	.3396	-1.2003
152			2	**	1	.8536	.5162	2	.4838	.0385
153			2	**	1	.2821	.6915	2	.3085	1.2986
154			2	**	1	.8490	.5710	2	.4290	.4134
155			2		2	.8701	.5193	1	.4807	-.2026
156			2	**	1	.3800	.6662	2	.3338	1.1009
157			2		2	.7584	.5878	1	.4122	-.6737
158			2	**	1	.1473	.7364	2	.2636	1.6720
159			2		2	.3501	.6735	1	.3265	-1.3005
160			2		2	.3880	.6642	1	.3358	-1.2294
161			2	**	1	.8769	.5658	2	.4342	.3779
162			2	**	1	.7120	.5965	2	.4035	.5922
163			2	**	1	.8906	.5231	2	.4769	.0855
164			2	**	1	.7488	.5896	2	.4104	.5433
165			2		2	.4232	.6560	1	.3440	-1.1670
166			2		2	.4380	.6526	1	.3474	-1.1417
167			2		2	.3123	.6833	1	.3167	-1.3766
168			2		2	.6425	.6099	1	.3901	-.8303
260			2	**	1	.5933	.6197	2	.3803	.7570
261			1		1	.8769	.5658	2	.4342	.3779
262			1	**	2	.9390	.5321	1	.4679	-.2897
264			2		2	.6352	.6114	1	.3886	-.8406
266			2	**	1	.1955	.7183	2	.2817	1.5174
267			1		1	.3691	.6691	2	.3309	1.1230
268			1		1	.9390	.5545	2	.4455	.2996
270			1		1	.9510	.5343	2	.4657	.1616
272			1		1	.6346	.6115	2	.3885	.6983

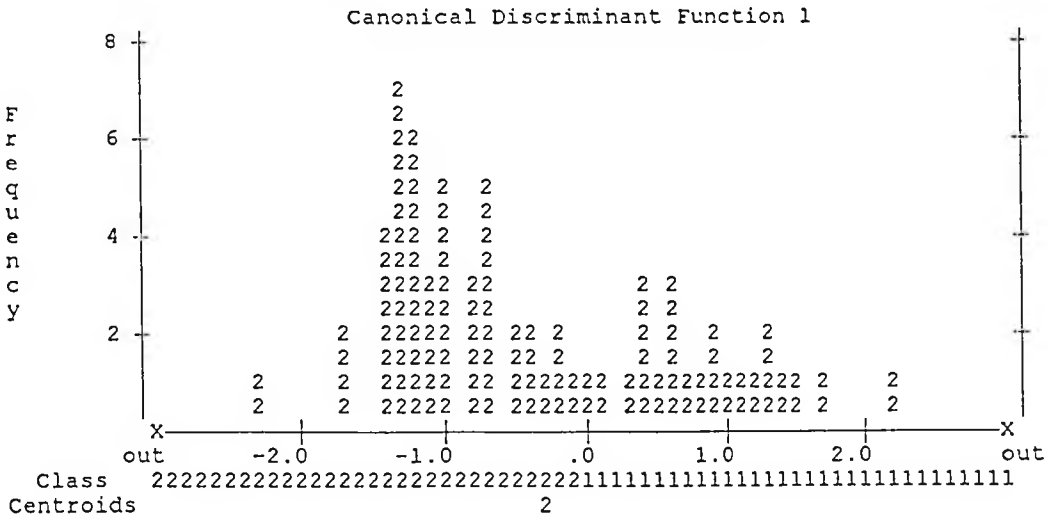
Symbols used in plots

Symbol	Group	Label
1	1	
2	2	

Histogram for group 1

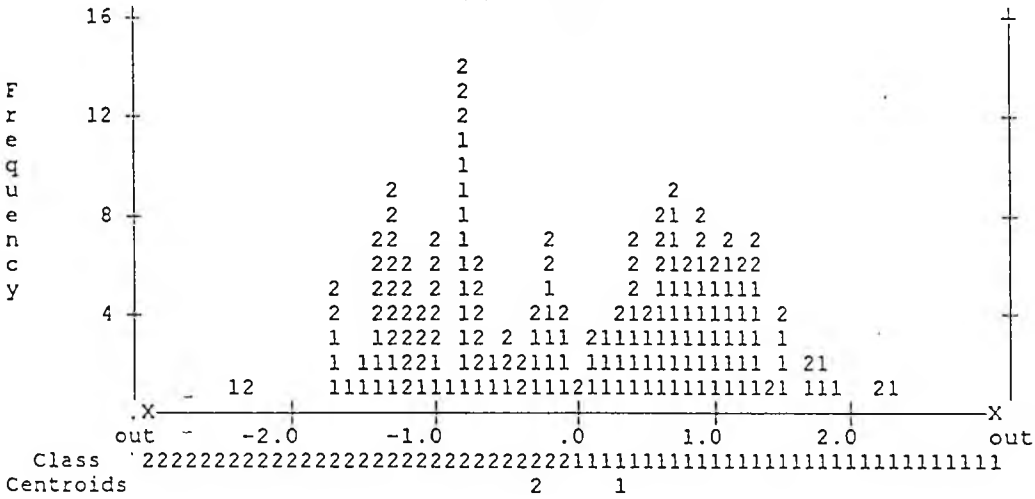


Histogram for group 2



All-groups Stacked Histogram

Canonical Discriminant Function 1



Classification results -

Actual Group	No. of Cases	Predicted Group Membership 1	2
Group 1	110	69 62.7%	41 37.3%
Group 2	67	23 34.3%	44 65.7%

Percent of "grouped" cases correctly classified: 63.84%

Classification processing summary

274 (Unweighted) cases were processed.
0 cases were excluded for missing or out-of-range group codes.
97 cases had at least one missing discriminating variable.
177 (Unweighted) cases were used for printed output.

APPENDIX XV - DISCRIMINANT ANALYSIS II

On groups defined by TYPE

274 (Unweighted) cases were processed.
97 of these were excluded from the analysis.
97 had at least one missing discriminating variable.
177 (Unweighted) cases will be used in the analysis.

Number of cases by group

TYPE	Number of cases Unweighted	Weighted	Label
1	110	110.0	
2	67	67.0	
Total	177	177.0	

KEY

1 = Control
2 = DNA

Group means

TYPE	AGE	REFEREE	SEX
1	56.64545	1.48182	1.60000
2	46.31343	1.53731	1.52239
Total	52.73446	1.50282	1.57062

Group standard deviations

TYPE	AGE	REFEREE	SEX
1	21.98064	.60171	.49214
2	23.33304	.85962	.50327
Total	22.99216	.70810	.49639

Wilks' Lambda (U-statistic) and univariate F-ratio
with 1 and 175 degrees of freedom

Variable	Wilks' Lambda	F	Significance
AGE	.95223	8.7799	.0035
REFEREE	.99855	.2547	.6144
SEX	.99422	1.0180	.3144

On groups defined by TYPE

Analysis number 1

Direct method: all variables passing the tolerance test are entered.

Minimum tolerance level..... .00100

Canonical Discriminant Functions

Maximum number of functions..... 1
Minimum cumulative percent of variance... 100.00
Maximum significance of Wilks' Lambda.... 1.0000

Prior probability for each group is .50000

Canonical Discriminant Functions

Fcn	Eigenvalue	Pct of Variance	Cum Pct	Canonical Corr	After Fcn	Wilks' Lambda	Chi-square	df	Sig
				:	0	.948293	9.211	3	.0266
1*	.0545	100.00	100.00	.2274 :					

* Marks the 1 canonical discriminant functions remaining in the analysis.

Standardized canonical discriminant function coefficients

	Func 1
AGE	.94082
REFEREE	-.15464
SEX	.22128

Structure matrix:

Pooled within-groups correlations between discriminating variables and canonical discriminant functions
(Variables ordered by size of correlation within function)

	Func 1
AGE	.95923
SEX	.32663
REFEREE	-.16337

Canonical discriminant functions evaluated at group means (group centroids)

Group	Func 1
1	.18121
2	-.29750

Case Number	Mis Val	Sel	Actual Group		Highest Probability Group	P(D/G)	P(G/D)	2nd Highest Group	P(G/D)	Discrim Scores
1			1	**	2	.0096	.7948	1	.2052	-2.8870
2			1		1	.7724	.5629	2	.4371	.4705
3			1		1	.8045	.5580	2	.4420	.4287
4			1	**	2	.1724	.6830	1	.3170	-1.6620
5			1	**	2	.1113	.7062	1	.2938	-1.8899
6			1	**	2	.2754	.6540	1	.3460	-1.3881
7			1		1	.7548	.5656	2	.4344	.4935
8			1	**	2	.1082	.7076	1	.2924	-1.9040
9			1		1	.6922	.5754	2	.4246	.5771
10			1	**	2	.1798	.6807	1	.3193	-1.6390
11			1		1	.8045	.5580	2	.4420	.4287
12			1	**	2	.0393	.7505	1	.2495	-2.3587
13			1		1	.7936	.5597	2	.4403	.4428
14			1		1	.4049	.6256	2	.3744	1.0141
15			1		1	.2431	.6623	2	.3377	1.3486
16			1		1	.9694	.5332	2	.4668	.2196
17			1		1	.2974	.6487	2	.3513	1.2231
18			1		1	.8959	.5442	2	.4558	.3121
19			1	**	2	.8371	.5040	1	.4960	-.0919
20			1		1	.6120	.5884	2	.4116	.6884
21			1		1	.4537	.6162	2	.3838	.9304
22			1		1	.5794	.5939	2	.4061	.7355
23			1	**	2	.9807	.5257	1	.4743	-.2733
24			1	**	2	.7354	.5687	1	.4313	-.6355
25			1		1	.9490	.5210	2	.4790	.1172
26			1		1	.2785	.6533	2	.3467	1.2650
27			1		1	.5733	.5949	2	.4051	.7444
28			1		1	.3999	.6266	2	.3734	1.0229
29			1	**	2	.7496	.5664	1	.4336	-.6167
30			1	**	2	.9474	.5207	1	.4793	-.2315
31			1		1	.8386	.5043	2	.4957	-.0224
32			1		1	.5830	.5932	2	.4068	.7302
33			1	**	2	.7181	.5714	1	.4286	-.6585
34			1		1	.8497	.5060	2	.4940	-.0083
35			1		1	.2746	.6542	2	.3458	1.2738
36			1		1	.8497	.5060	2	.4940	-.0083
37			1	**	2	.9544	.5218	1	.4782	-.2403
38			1	**	2	.1752	.6821	1	.3179	-1.6531
39			1		1	.3594	.6349	2	.3651	1.0977
40			1		1	.3379	.6395	2	.3605	1.1395
41			1		1	.8191	.5558	2	.4442	.4099
42			1		1	.6783	.5776	2	.4224	.5959
43			1		1	.5452	.5997	2	.4003	.7862
44			1		1	.5328	.6019	2	.3981	.8050
45			1		1	.8045	.5580	2	.4420	.4287
46			1	**	2	.2538	.6595	1	.3405	-1.4388
47			1	**	2	.9194	.5407	1	.4593	-.3987
48			1		1	.7868	.5607	2	.4393	.4517
49			1		1	.2339	.6647	2	.3353	1.3716

Case Number	Mis Val	Sel	Actual Group		Highest Probability Group	P(D/G)	P(G/D)	2nd Highest Group	P(G/D)	Discrim Scores
50			1		1	.4156	.6235	2	.3765	.9953
51			1		1	.9377	.5193	2	.4807	.1030
52			1		1	.3999	.6266	2	.3734	1.0229
53			1		1	.5178	.6045	2	.3955	.8260
54			1	**	2	.5560	.5978	1	.4022	-.8863
55			1		1	.9377	.5193	2	.4807	.1030
56			1		1	.6182	.5874	2	.4126	.6796
57			1		1	.6719	.5787	2	.4213	.6048
58			1		1	.8645	.5082	2	.4918	.0105
59			1	**	2	.4011	.6263	1	.3737	-1.1372
60			1	**	2	.9568	.5351	1	.4649	-.3516
61			1		1	.4289	.6209	2	.3791	.9723
62			1		1	.3594	.6349	2	.3651	1.0977
63			1	**	2	.3097	.6459	1	.3541	-1.3133
64			1		1	.4289	.6209	2	.3791	.9723
65			1		1	.7724	.5629	2	.4371	.4705
66			1		1	.4911	.6093	2	.3907	.8698
67			1		1	.1820	.6799	2	.3201	1.5158
68			1		1	.7299	.5695	2	.4305	.5265
69			1	**	2	.9099	.5151	1	.4849	-.1844
70			1		1	.1109	.7064	2	.2936	1.7756
71			1		1	.3770	.6312	2	.3688	1.0647
72			1		1	.5057	.6066	2	.3934	.8468
73			1		1	.9639	.5232	2	.4768	.1360
74			1		1	.4484	.6172	2	.3828	.9393
75			1	**	2	.8371	.5040	1	.4960	-.0919
76			1	**	2	.6669	.5795	1	.4205	-.7279
77			1		1	.6616	.5803	2	.4197	.6189
78			1		1	.2395	.6632	2	.3368	1.3574
79			1	**	2	.2312	.6655	1	.3345	-1.4947
80			1	**	2	.4249	.6216	1	.3784	-1.0954
81			1		1	.3594	.6349	2	.3651	1.0977
82			1		1	.4484	.6172	2	.3828	.9393
83			1		1	.9029	.5431	2	.4569	.3032
84			1	**	2	.0653	.7305	1	.2695	-2.1408
85			1		1	.6379	.5842	2	.4158	.6519
86			1	**	2	.7883	.5605	1	.4395	-.5660
87			1		1	.4484	.6172	2	.3828	.9393
88			1		1	.7406	.5678	2	.4322	.5123
89			1		1	.8497	.5060	2	.4940	-.0083
90			1		1	.3548	.6359	2	.3641	1.1066
91			1	**	2	.0490	.7421	1	.2579	-2.2662
92			1		1	.2974	.6487	2	.3513	1.2231
93			1	**	2	.1639	.6859	1	.3141	-1.6897
94			1		1	.2232	.6677	2	.3323	1.3992
95			1		1	.4793	.6114	2	.3886	.8886
96			1	**	2	.9568	.5351	1	.4649	-.3516
97			1		1	.6416	.5836	2	.4164	.6466
98			1		1	.8191	.5558	2	.4442	.4099

Case Number	Mis Val	Sel	Actual Group		Highest Group	Probability P(D/G)	P(G/D)	2nd Highest Group	P(G/D)	Discrim Scores
99			1		1	.7936	.5597	2	.4403	.4428
100			1	**	2	.9972	.5290	1	.4710	-.3010
101			1		1	.6922	.5754	2	.4246	.5771
102			1		1	.2604	.6578	2	.3422	1.3068
103			1		1	.1205	.7022	2	.2978	1.7338
104			1		1	.2746	.6542	2	.3458	1.2738
105			2	**	1	.6616	.5803	2	.4197	.6189
106			2	**	1	.4238	.6219	2	.3781	.9811
107			2		2	.2368	.6639	1	.3361	-1.4806
108			2	**	1	.2395	.6632	2	.3368	1.3574
109			2	**	2	.4496	.6169	1	.3831	-1.0536
110			2		2	.1177	.7034	1	.2966	-1.8622
111			2	**	1	.9490	.5210	2	.4790	.1172
112			2	**	1	.6416	.5836	2	.4164	.6466
113			2	**	1	.7936	.5597	2	.4403	.4428
114			2		2	.8533	.5506	1	.4494	-.4824
115			2	**	1	.9419	.5199	2	.4801	.1083
116			2		2	.1156	.7043	1	.2957	-1.8711
117			2		2	.0571	.7360	1	.2640	-2.2003
118			2		2	.8863	.5456	1	.4544	-.4406
119			2		2	.2693	.6555	1	.3445	-1.4023
120			2		2	.8863	.5456	1	.4544	-.4406
121			2	**	1	.8045	.5580	2	.4420	.4287
122			2		2	.9099	.5151	1	.4849	-.1844
123			2		2	.7604	.5648	1	.4352	-.6025
124			2		2	.0444	.7459	1	.2541	-2.3080
125			2	**	1	.9914	.5299	2	.4701	.1920
126			2		2	.9639	.5340	1	.4660	-.3428
127			2		2	.9860	.5307	1	.4693	-.3151
128			2		2	.1177	.7034	1	.2966	-1.8622
129			2		2	.3558	.6357	1	.3643	-1.2209
130			2		2	.4287	.6209	1	.3791	-1.0890
131			2	**	1	.8587	.5498	2	.4502	.3592
132			2		2	.7248	.5703	1	.4297	-.6496
133			2		2	.0594	.7344	1	.2656	-2.1826
134			2	**	1	.5891	.5922	2	.4078	.7214
135			2		2	.9639	.5340	1	.4660	-.3428
136			2		2	.5133	.6053	1	.3947	-.9512
137			2		2	.7155	.5718	1	.4282	-.6620
138			2		2	.1055	.7088	1	.2912	-1.9164
139			2		2	.8904	.5450	1	.4550	-.4352
140			2		2	.6330	.5850	1	.4150	-.7751
141			2		2	.9474	.5207	1	.4793	-.2315
142			2	**	1	.4238	.6219	2	.3781	.9811
143			2		2	.5560	.5978	1	.4022	-.8863
144			2		2	.1752	.6821	1	.3179	-1.6531
145			2		2	.8793	.5467	1	.4533	-.4494
146			2	**	1	.2232	.6677	2	.3323	1.3992
147			2	**	1	.7339	.5689	2	.4311	.5212

Case Number	Mis Val	Sel	Actual Group		Highest Group	Probability P(D/G)	P(G/D)	2nd Highest Group	P(G/D)	Discrim Scores
148			2		2	.6035	.5898	1	.4102	-.8169
149			2	**	1	.3130	.6451	2	.3549	1.1902
150			2	**	1	.2604	.6578	2	.3422	1.3068
151			2		2	.2034	.6734	1	.3266	-1.5695
152			2		2	.9141	.5157	1	.4843	-.1897
153			2	**	1	.6480	.5825	2	.4175	.6377
154			2	**	1	.4156	.6235	2	.3765	.9953
155			2		2	.4249	.6216	1	.3784	-1.0954
156			2	**	1	.9419	.5199	2	.4801	.1083
157			2	**	1	.8587	.5498	2	.4502	.3592
158			2	**	1	.2507	.6603	2	.3397	1.3298
159			2		2	.0887	.7170	1	.2830	-2.0001
160			2		2	.9431	.5201	1	.4799	-.2262
161			2	**	1	.8629	.5492	2	.4508	.3539
162			2	**	1	.8959	.5442	2	.4558	.3121
163			2	**	1	.9178	.5409	2	.4591	.2844
164			2	**	1	.8959	.5442	2	.4558	.3121
165			2		2	.5844	.5930	1	.4070	-.8445
166			2		2	.9194	.5407	1	.4593	-.3987
167			2		2	.6330	.5850	1	.4150	-.7751
168			2	**	1	.9419	.5199	2	.4801	.1083
260			2	**	1	.6120	.5884	2	.4116	.6884
261			1		1	.8629	.5492	2	.4508	.3539
262			1	**	2	.5283	.6026	1	.3974	-.9282
264			2		2	.8440	.5051	1	.4949	-.1007
266			2	**	1	.1820	.6799	2	.3201	1.5158
267			1		1	.5000	.6077	2	.3923	.8557
268			1		1	.9623	.5342	2	.4658	.2285
270			1	**	2	.8880	.5118	1	.4882	-.1567
272			1	**	2	.9789	.5318	1	.4682	-.3240

Symbols used in plots

Symbol	Group	Label
1	1	
2	2	

Histogram for group 2

Canonical Discriminant Function 1

```
        8 +                                                                  +
          |                                                                  |
Frequency 6 +                                                                  +
          |                                 2       2                        |
          |                                 2       2                        |
          4 +           2           2   2 2  2  2                            +
          |             2           2   2 2  2  2                            |
          |             2       2   2   222  2 22 2   2                      |
          |             2       2   2   222  2 22 2   2                      |
          2 +       2   2       2   2 2 222  2 22 22  2  22                  +
          |       2   2       2   2 2 222  2 22 22  2  22                  |
          |      22  22 2222 222222222222 2222222  2 2222                   |
          |      22  22 2222 222222222222 2222222  2 2222                   |
          X-----------+---------+---------+---------+---------+-----------X
        out      -2.0      -1.0        .0       1.0       2.0        out
  Class  2222222222222222222222222222221111111111111111111111111111111111
Centroids                                 2
```

Histogram for group 1

Canonical Discriminant Function 1

```
        8 +                                     1                            +
          |                                     1                            |
          |                                     1     1                      |
Frequency 6 +                                   1     1                      +
          |                                     1111 111                     |
          |                                     1111 111                     |
          |                                1    1111 111 1                   |
          |                                1    1111 111 1                   |
          4 +                           1 11   11111111 1                    +
          |                             1 11   11111111 1                    |
          |                1          1 111 11  11111111 11                  |
          |                1          1 111 11  11111111 11                  |
          2 +            1 1  1  1 1 11 1111111111111111111                   +
          |            1 1  1  1 1 11 1111111111111111111                   |
          |  1    11 1 1 11111 1 1 11 1111111111111111111111 11             |
          |  1    11 1 1 11111 1 1 11 1111111111111111111111 11             |
          X-----------+---------+---------+---------+---------+-----------X
        out      -2.0      -1.0        .0       1.0       2.0        out
  Class  2222222222222222222222222222221111111111111111111111111111111111
Centroids                                 1
```

All-groups Stacked Histogram

Canonical Discriminant Function 1

```
      16 +                                                                  +
         |                                                                  |
         |                                   2                              |
F     12 +                                   2                              +
r        |                                   2                              |
e        |                                   2                              |
q        |                                   2                              |
u        |                                   2 2   2                        |
e      8 +                           2 2  2  1 22  2                        +
n        |                           2 2  2  1222 12  2                     |
c        |                 2         22_  2  1111 111 2                     |
y        |                 2       2    2 222 12 21111 111 12               |
      4 +                  2 2     2  2 2 221 11 211111111 12               +
         |                 2 1  2  2 2221 111211221111111211                |
         |              22  1 1221  1 1211 111111111111111111112             |
         |  1         112121 111112121211211111111111111111111 11            |
         X-------------------------------------------------------------------X
        out      -2.0      -1.0        .0        1.0       2.0          out
  Class  2222222222222222222222222222221111111111111111111111111111111111
Centroids                                 2   1
```

Classification results -

Actual Group		No. of Cases	Predicted Group Membership 1	2
Group	1	110	75 68.2%	35 31.8%
Group	2	67	28 41.8%	39 58.2%

Percent of "grouped" cases correctly classified: 64.41%

Classification processing summary

```
274 (Unweighted) cases were processed.
  0 cases were excluded for missing or out-of-range group codes.
 97 cases had at least one missing discriminating variable.
177 (Unweighted) cases were used for printed output.
```