THE

CARE OF

DIABETES MELLITUS

IN

GENERAL PRACTICE:

PROMPTING STRUCTURED CARE

IN

ISLINGTON.

MD Thesis
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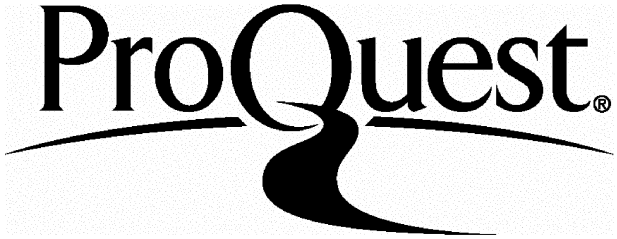

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MD Thesis: Abstract

Over the past 20 years there have been numerous attempts to improve the care of diabetic patients in general practice. Approximately half of all patients with diabetes do not attend hospital clinics regularly, and require structured care in the community. In addition, there has also been a developing tendency, in the case of those patients who attend hospital clinics, for consultants to transfer their care back to general practitioners.

Several reports appeared in the 1970s in which GPs studied the care of their diabetic patients and made suggestions for improvement. Community care initiatives were also reported on the part of hospital consultants which placed new demands upon general practitioners in caring for these patients. These initiatives together with changes in the traditional pattern of diabetic care in the UK are discussed.

This thesis describes attempts to foster structured care of diabetic patients in an inner city locality of London beginning in 1983. It evaluates the medical effectiveness and acceptability to patients, general practitioners and optometrists, of a centrally organised prompting system to support the primary care of Type II diabetic patients.

In a prospective randomised study involving two hospital outpatient clinics, 38 general practices and 14 optometrists, 181 non insulin treated patients were randomly allocated to prompted care in the community, or to continued attendance at their hospital clinic (control group). Community care consisted of coordinated six monthly prompts sent to patients for laboratory tests followed by clinical review in general practice in normal surgery time, with annual dilated fundoscopy by high street optometrists. Hospital care consisted of the usual care offered at the diabetic clinics of the

district general hospital.

Prompted structured care was found to be safe and effective over a $2^1/_2$ year period. It was acceptable to patients, interfaced well with the practice of local GPs, and proved popular with optometrists. This approach to organising primary care of Type II diabetes in a district is further discussed.

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Abbreviations

BDA	British Diabetic Association
c:	Control group value
df	Degrees of freedom
DGH	District General Hospital
FHSA	Family Health Services Authority
FHSCU	Family Health Services Computer Unit
FPC	Family Practitioner Committee
HbA_1	Glycated haemoglobin
IDDM	Insulin dependent (Type I) diabetes
NIDDM	Non insulin dependent (Type II) diabetes
p:	Prompted group value
RCP	Royal College of Physicians
RCGP	Royal College of General Practitioners
UCL	University College London
UK	United Kingdom

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SECTION I

Historical Background:
Organisation of diabetic care in the UK.

SECTION I

HISTORICAL BACKGROUND

The organisation of UK diabetic care prior to 1980

INTRODUCTION

This section examines the development of diabetic services since the discovery of insulin. Broad historical influences are outlined and factors are traced which have been influential in a change of policy away from support for concentrating diabetic care in hospital clinics, towards one which now places increased emphasis upon the role of general practitioners.

Recent studies of community care of diabetes are discussed more fully in Section II. The purpose of the historical review in Section I is to provide a context for the Islington Initiative, the design conduct and evaluation of which is the concern of Section III of the thesis.

Growth of diabetic care in hospital clinics

The modern era of hospital diabetic outpatient care was occasioned by the development of insulin in the 1920s, the first diabetic clinic being established in Liverpool in 1922. Within 7 years a further 14 hospital clinics had been established, and by 1944 this number had grown to 73 (Watkins 1979). Perhaps because little in the way of medical treatment could be offered to non-insulin treated patients, the care of diabetes was not considered an important or interesting medical speciality at that time. Reflecting upon the development of diabetology as a discipline one of its practitioners later observed:

> 'The numbers attending hospital for advice and supervision mounted rapidly and the out-patient physicians were unwilling or unable to give up the considerable time involved. As a result diabetic clinics were set up primarily, I suspect, in order to get rid of these unwanted cases rather than provide them with expert care' (Malins 1968).

The general lack of interest in treating diabetes on the part of general physicians was notable (Walker 1989) and was one factor

which spurred the newly founded Diabetic Association in 1934 (later to be renamed the British Diabetic Association) to press for the development of better services for diabetics (British Diabetic Association 1992). In the inter-war period, hospital diabetic clinics were sometimes run solely by non medically qualified biochemists, or dietitians, and the Diabetic Association campaigned for the establishment of more hospital facilities as well as the appointment of physicians who would both treat and research into the condition.

In the inter-war period, the numbers of patients attending hospital outpatients continued to increase (Malins 1968, Walker 1989) as a result of several factors; these included the desire of uninsured people to avoid paying their general practitioner, a growing recognition that many patients needed long term monitoring and were also suitable for research studies, a lack of confidence (and possibly interest) on the part of many GPs in treating diabetes, and mistrust, by hospital consultants, of the abilities of general practitioners (Cochrane 1972). Though required by a only a minority of patients, the use of insulin meant that laboratory blood glucose estimations were necessary to monitor its effects so as to decide dosage. However, from 1926, National Health Insurance excluded payment for GP use of laboratories on the panel and this undoubtedly ensured that many patients with diabetes gravitated towards hospital out-patient clinics. (Honigsbaum 1979).

Defining the role of hospital diabetic clinics

Five years after the establishment of the NHS Dr J B Walker of the Royal Infirmary, Leicester, published an influential paper entitled *Field Work Of A Diabetic Clinic* in which she noted that there were by then 141 diabetic clinics across the country providing clinical services to an estimated 200,000 patients (Walker 1953). In the same year the Ministry of Health issued a circular stating that diabetics

> 'need regular, though often infrequent, specialist medical supervision ... [and their requirements]... can best be met by planning the provision of special centres in support of the family doctor on a Regional basis. The largest centres, probably in Teaching Hospitals, might have physicians mainly

specialising in diabetes, but in most cases the centres will be in charge of a general physician with a special interest in this condition'. (Ministry of Health 1953).

The functions of a diabetic clinic were first discussed by RD Lawrence in general terms soon after 1922 (Lawrence 1925) but they were most clearly formulated by Dr Walker in the early 1950s who included:

' - Confirmation of the diagnosis of diabetes and search for complicating factors.
- Organisation of treatment, including instruction for the patient and the relatives.
- A follow-up service to maintain good health and prevent complications.
- Record keeping to ensure consistent treatment and facilitate research' (Walker 1953).

Noting that the last three functions could not be adequately accomplished solely within a hospital setting, Dr Walker argued the case for the attachment to diabetic hospital clinics of specialist health visitors. Their role, she believed, would be to provide expert domiciliary care, education, and insulin adjustment in patients' homes. Though mainly concerned, at this time, with the initiation of insulin treatment in children, it is clear from the job description outlined in this paper, together with illustrative clinical cases, that a health visitor would also ensure stabilisation in the community and could help to optimise the coping strategies of patients and relatives. To this extent, as early as 1953, Walker acknowledged the importance of care in the community. Although a health visitor service for diabetic patients had previously been established in Cardiff, run by the local authority, Dr Walker's health visitor was attached to the hospital diabetic clinic and was clearly the precursor of the modern diabetes specialist nurse (who made her first appearance in Britain in the mid 1970s (Judd et al 1976)).

Increasing visibility of diabetes mellitus

In 1956, the British Diabetic Association offered to sponsor a prevalence study of diabetes in an English population. The first community diabetes survey had been reported in 1947 in the USA. It had revealed a prevalence of 0.87% diagnosed and 0.67% undiagnosed diabetes in the town of Oxford, Massachusetts (Wilkerson and Krall

1947). Further studies from North America followed and were duly acknowledged by Walker before she began the first survey of an English population some 10 years later (Kenny et al 1951, Kenny and Chute 1953).

Dr Walker chose to perform her 'detection drive' in the Leicestershire village of Ibstock because she knew this to be a stable population served by one general practice which was staffed by a husband and wife who had already studied the neighbourhood (Walker 1989). One of the GPs was a clinical assistant in the diabetic clinic in Leicester, 15 miles away. 81% of the entire population were screened with results that were comparable with the American findings. The prevalence of already diagnosed diabetes was found to be 0.8% with a further 0.6% newly detected by the study. A follow-up survey in 1962 found 1.33% already diagnosed with a further 0.5% undiagnosed. Within a few years, subsequent studies in different parts of the country assigned comparable values to the prevalence of diabetes (Redhead 1960, Harkness 1962, Royal College of General Practitioners Diabetes Working Party 1962, Stewart and Robertson 1963, Sharp 1964).

As these studies indicated, the numbers of diabetic hospital clinics and outpatient attendances seemed to be increasing hand in hand with a rising number of patients with the condition. Although there was some debate about a possible rising incidence of diabetes (Walker 1989) the increase in patient numbers was mostly judged, at the time, to be the result of increased detection rather than a true increase in incidence in diabetes.

Policy begins to change

In the early 1960s, Joan Walker published figures on the annual number of new patient referrals and the total number of attendances at her diabetic clinic in Leicester. Both figures showed a doubling of clinic numbers in ten years. The Ministry of Health had based its 1953 estimate for the number of specialist centres and inpatient beds required to treat diabetes upon a prevalence of 3 per 1000 of the general population. The true prevalence had been shown to be

more like 5 times this figure and the Ministry of Health began to reconsider its policy. In 1963 it issued a circular on the *Regional Planning of Diabetic Services* which stated

> 'where they do not exist, adequately staffed and equipped diabetic clinics should be established at every major general hospital. In addition, there is need for further coordination of the diabetic services provided, not only in hospitals, but also by general practitioners and the local health authorities. It is important that this subject should be reviewed immediately because of the increasing number of diabetics in the community.' (Ministry of Health 1963)

A clear appreciation of the magnitude of the diabetic care problem appears in this policy statement, together with recognition that the care of this condition could not be adequately encompassed by a strategy of hospital clinic care only. Notwithstanding this understanding at a high level in the administration of the NHS, the number of hospital diabetic clinics was still thought to be rising in 1968 (Watkins 1979). In that year, an eminent diabetologist first voiced his wish to discharge many of these patients from his hospital clinic. In his *Textbook Of Clinical Diabetes Mellitus* Malins stated that

> 'most physicians who run diabetic clinics would be glad to know of any satisfactory method by which patients could be returned to the care of their own doctor. At present it seems that it would require a far stronger liaison between hospital and practitioner than time permits.' (Malins 1968)

Malins' textbook further elaborated the functions of the hospital diabetic clinic. A hospital clinic should have the following objectives:

'1 The creation of a skilled team including physicians, nurses, health visitors, medical social workers, dietitians and chiropodists
2 The education of patients
3 The education of those who have to look after diabetics; general practitioners, district nurses
4 The care of diabetic patients with other major illness and with complications requiring hospital care, e.g. gangrene
5 Research into special aspects of diabetes
6 The provision of material for research by other specialists; e.g. renal disease
7 Therapeutic trials.' (Malins 1968).

In this list of objectives Malins explicitly recognised the importance of a multi-skilled diabetes health care team, operating from a single clinic with the broad aims of patient care and

research into diabetes. However, any attempt to devolve care elsewhere would have to tackle the difficulties of re-locating these skills and resources from the hospital into the community. Malins' reference to the role of the clinic in providing education to general practitioners and district nurses discloses a hospital responsibility towards the care of diabetic patients in the community, though the extent and content of this responsibility remained undefined by him at that time.

Malins' textbook of diabetes heralds the beginning of a change in belief by hospital diabetologists, that more hospital diabetic clinics represented the best organisational solution to providing care for these patients. From the time of its publication in 1968 there also developed a growing interest in attempts to limit the size of these clinics by discharging patients back to general practitioner care. Malins' own model of how this could be achieved was set out in a paper entitled *Diabetic Clinic in a General Practice* (Malins and Stuart 1971).

This paper had a programmatic effect on later attempts by others to develop new ways of providing diabetic care at primary care level. Although the paper stated that a similar clinic was in operation in two other practices in Birmingham, the strategy of diabetic clinics held jointly by a consultant and senior registrar in numerous general practices within a district was not seen as a practical one. Within five years the idea was described as an 'almost idyllic scene' (Smith 1976).

In the same year that Malins proposed consultant run clinics in general practice Thorn stated his belief that

> 'Diabetic clinics were introduced to deal with Insulin: if oral treatment or diet alone was suitable for all diabetic patients, there would be many less diabetic clinics. ... if they continue to try to cope with most diabetics, they will defeat their own objects.' (Thorn 1971)

In the Wolverhampton it was a desire to rationalise the case-mix of the hospital diabetic clinic which motivated Thorn to establish the first mini-clinic scheme in 1971 (Thorn and Russell 1973). A year

later Hill commenced a community care scheme in Poole with similar motives. In his first report on the scheme he wrote:

> 'Because of overcrowding at the district general hospital's diabetic clinic the aims of treatment were being increasingly frustrated. To overcome this problem we asked general practitioners to share the diabetic work load with the clinic' (Hill 1976a).

These attempts to improve the quality of care in hospital diabetic clinics by a structured sharing of workload with GPs prefigured a more general change of view, on the part of some consultant diabetologists,. In 1977, the Royal College of Physicians endorsed the new approach:

> 'Whenever possible, the care of the [diabetic] patient should remain with the General Practitioner, and the Physician should promote this process in the District...' (Royal College of Physicians 1977).

Additional changes favouring community diabetic care

After the creation of the new GP Charter in 1966 general practice began to develop in a number of important ways. More partnerships were formed, an increasing number of GPs began employing practice nurses or arranging for attachments of new staff, and premises were slowly improved. The College of General Practitioners promoted the development of practice teams with responsibility for sharing the care of patients either entirely within a practice, or in association with community health services.

The work of general practitioners was intensively studied, resulting in a greater understanding of the multiplicity and complexity of tasks which GPs are required to perform (Cartwright 1967, Royal College of General Practitioners 1970, National Morbidity Statistics 1974, 1979, 1986, Cartwright & Anderson 1981). Important roles in prevention and in the monitoring of chronic conditions were defined. In the context of a health service which was becoming increasingly specialised, and in which medical care could become fragmented, the importance of continuity of care from a generalist such as a general practitioner gained new emphasis (Royal College of General Practitioners 1977). The system whereby patients are required to register with a GP before they can receive medical services in the

NHS was turned to great effect by some GPs who wished to develop systematic knowledge of a practice population which could then be used for epidemiological or health care planning purposes (Hart 1970, 1974).

In the early 1970s sporadic reports appeared in which GPs described audits of the clinical care of their registered diabetic patients (Wilks 1973, Doney 1976, Ruben 1976, Kratky 1977). These studies are discussed in detail in Section II. In the same period, increasing concern was being expressed about the poor level of liaison and communication between primary and secondary care, particularly in the management of chronic diseases (Tulloch et al 1975, Smith 1976, Tulloch 1979). The British Medical Journal pressed for more attention to be paid to the educational needs of the carers and the channels of communication between them (Anon. 1976).

Studies were undertaken to document the efficiency of hospital diabetic clinics (Porter & Robertson 1972) which revealed that a large proportion of patients with diabetes were not regular attenders at one hospital clinic. Doney found that only a third of already diagnosed patients in a large group practice in Winchester were attenders at a hospital clinic (Doney 1976). Malone reported the figure to be 47% in a group practice in Ireland (Malone 1982) and Yudkin et al found that only 46% of diabetics registered with three group practices in East London were hospital clinic attenders (Yudkin et al 1980). These studies pointed to a population of patients with a potentially large amount of unmet medical need which could only be realistically met by improving the primary care of diabetic patients.

In summary, the past 50 years or so have seen important changes in the nature of diabetic care in the UK. These developments have been accompanied by a change in outlook towards the provision of diabetic care, from the view that most patients should be routinely reviewed in hospital clinics, to the understanding that most diabetic patients could be adequately cared for in general practice. The following considerations have been influential in the adoption of

the current view:

1 The prevalence of diabetes is greater than was once thought and is increasing as society ages. More case-finding has meant fewer undiagnosed cases, with consequent greater ascertainment of the condition. Better treatment of the disease and longer survival also contributes to an increased total prevalence. Such large numbers of patients cannot all receive regular diabetic review in hospital diabetic clinics (Royal College of Physicians/British Diabetic Association 1984).

2 There has been a realisation that overcrowded clinics, overburdened with large numbers of uncomplicated diabetics cannot deliver appropriate care for those most in need of the expertise and skill concentrated in hospital. The educational needs of many patients may be particularly ill-served by hospital clinics and there is now a move not only to transfer more patients to the care of GPs, but also to decant patients from outpatients to Day Centres (Ling et al 1985).

3 Audits from general practice and community surveys have shown that between 35-45% of already diagnosed patients are not attending a hospital diabetic clinic regularly. The best strategy for improving the diabetic care of these patients is to improve primary care of diabetes.

4 Diabetic self-care has been a dominant theme in the care of patients with diabetes for nearly 70 years (Lawrence 1925). The advent of self-monitoring techniques, first with urine tests, and later with blood glucose sticks, has intensified the importance of routine monitoring of diabetes between hospital clinic appointments (Gibbins et al 1983). Relocating patient care from the hospital into general practice is a logical development of this approach.

SECTION II

Promoting primary care of diabetes in Islington: 1983-87.

SECTION II

DEVELOPING PRIMARY CARE OF DIABETES IN ISLINGTON 1983-85

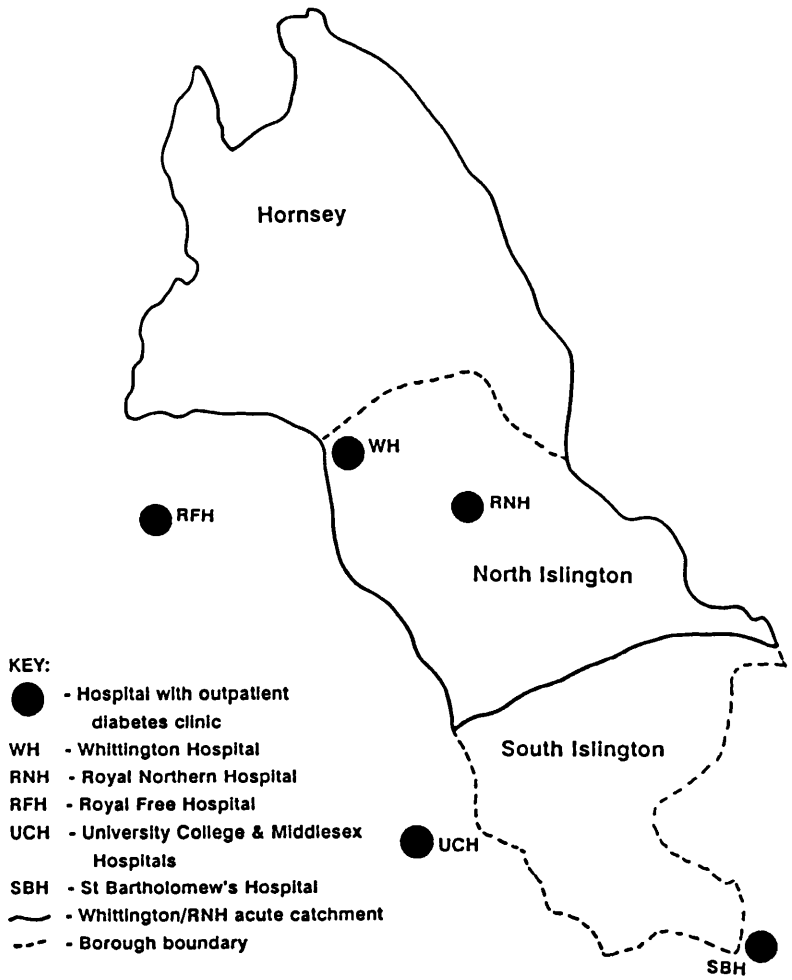
Chapter 1:

Inception of a structured care approach to general practice care in Islington

LOCAL BACKGROUND

The Whittington Hospital is the district general hospital in the London Borough of Islington and is situated at the northern edge of the Borough. In the early 1980s its acute catchment population consisted of residents of north Islington and the Hornsey area of Haringey and to a lesser extent south Islington (Figure 1).

Figure 1: Schematic Map of Islington District Health Authority Showing Acute Catchment of the Whittington Hospital



In keeping with most inner London hospitals at that time, its outpatient department accepted patients from a much wider area. The hospital diabetic clinic was especially large, having gained a national reputation over the previous two decades under the clinical leadership of Dr Arnold Bloom. This physician had arranged for all the hospital notes of diabetic patients to be filed separately from the main hospital filing system. An estimate of the size of the clinic, based upon a simple count of notes, came to 4500 in 1982. This amounted to twice the expected number of current attenders at the hospital clinic if it were providing only for the needs of local residents of its acute catchment assuming both a prevalence of diagnosed diabetes of 1% and that all known diabetics were referred to the Whittington clinic (Islington Health Authority 1982, 1983). In 1980, the number of new patients referred to the hospital clinic and the number of follow-up patients reviewed per week had amounted to 5.5 & 120 respectively. In 1983, the diabetic clinic of the Royal Northern Hospital was amalgamated with that of the Whittington, under the care of one consultant, although the Royal Northern clinic continued to be conducted on its separate site. At the time of the amalgamation, the Royal Northern diabetic clinic reviewed 2 new patients and 40 follow-up patients per week.

A specialist diabetes nurse practitioner had been appointed to the Whittington department of diabetes in the late 1970s. Her role was predominantly the monitoring and stabilisation of insulin treated patients at home as well as liaison with outpatient and inpatient care. Her job remit did not extend to promoting better GP care, nor to working with practice nurses or district nurses. When in 1980 Dr J S Yudkin was appointed consultant physician and senior lecturer to take over from Dr Bloom, he was not aware of any general practitioners in the district providing systematic care of diabetes.

Despite the size and reputation of the Whittington Hospital diabetic clinic many GPs, particularly those who worked on the periphery of the district, referred some of their diabetic patients to a number of other hospital clinics including to the Royal Free Hospital Hampstead, University College Hospital & The Middlesex Hospital in

Bloomsbury, or to St Bartholomew's Hospital in Smithfield (see Figure 1). Local links between GPs and hospital departments influenced referral patterns, together with ease of access by public transport and co-existent medical or surgical problems for those patients already attending a hospital clinic.

By the early 1980s, considerable interest and enthusiasm had developed for the transfer of diabetic care from hospital to primary care settings. As outlined in Section I, this represented a reversal of the traditional approach to the provision of diabetic care as it had developed in the UK.

Several schemes had already attempted to pioneer community care as a practical alternative to care provided by the traditional hospital clinic, and important opinion formers supported the case for much more primary care of diabetes (Anon. 1979, Anon. 1983). In 1983 a research fellowship was awarded to the author to join the diabetic department at the Whittington Hospital to work alongside Dr JS Yudkin. The purpose of the fellowship was to promote better monitoring and medical care of diabetic patients by general practitioners within the district. Initially, the aim had been to transfer many of the patients with uncomplicated diabetes from routine hospital clinic follow-up in outpatients to continuing care by their own general practitioner.

A review of existing literature was undertaken (Hurwitz 1983). The following reports proved influential in the initial approach taken in Islington.

REPORTS OF LOCAL INITIATIVES

Initiatives from 5 different localities offered valuable guidance as to the direction of change in Islington, and served either as models to emulate or to avoid.

Wolverhampton

Dr Pat Thorn began promoting the development of mini-clinics in the Wolverhampton area in 1970 (Thorn 1971). After one or more attendances at the hospital diabetic clinic selected patients,

whether treated by diet, tablets or insulin, were discharged to the care of their GP. A special record card, designed to be doctor-held, was adopted to facilitate follow-up and re-referral back to hospital, if indicated (Thorn 1971). Nearly a third of practices in the Wolverhampton area participated, the vast majority running regular special clinic sessions (dubbed 'mini-clinics') with the help of a practice nurse, or health visitor from the hospital clinic. Practices made their own arrangements for monitoring blood glucose using either dextrostix with or without a reflectance meter or by sending blood to the hospital laboratory.

Initially, 79% of participating practices' diabetic patients who had initially been hospital clinic attenders were discharged to their GPs, the remaining 21% being pre-dominantly insulin treated (Thorn et al 1973). All newly diagnosed diabetics continued to be referred to the hospital clinic for education and stabilisation before a decision was made about appropriate GP or hospital clinic follow-up.

In 1974 diabetic control in mini-clinic patients was assessed but no comparison with a hospital control group was made (Russell et al 1974). An interim evaluation was later published by which time 87% of the patients of participating practices had been discharged from the hospital clinic. 760 patients who attended mini-clinics were compared with 118 diabetics registered with mini-clinic practices who had continued to attend the hospital clinic (Thorn 1983). Patients receiving GP care were significantly older than the hospital group and though 32% of mini-clinic patients were on insulin, this compared with 88% of the hospital group, a reflection of the discharge policy which had been to return predominantly non insulin treated and well controlled, uncomplicated, insulin treated patients to GP care. Default from diabetic follow-up in mini-clinics was only 6.4% compared to 31% in the hospital clinic; Thorn described this as 'an important advantage of mini-clinic care' (Thorn 1983).

No special arrangements for eye review were built into this scheme. Several participating GPs were not confident about performing

retinal screening for their patients and had enlisted the help of high-street opticians. Thorn later commented that 'monitoring retinopathy is not as well done as it should be in the hospital or in the general practice mini-clinics: perfection in either is unobtainable at present' (Thorn 1983).

Despite the encouraging levels of patient attendance in mini-clinics, it is important to note that no specific process of diabetic care measures were reported in mini-clinic or hospital clinic patients in this paper.

Poole

At about the same time that Thorn set up the mini-clinic scheme in Wolverhampton, Dr R Hill started a community diabetic care scheme in Poole, Dorset. He had noted the increasing number of patients attending the local diabetic clinic at Poole General Hospital, together with increased demand for diabetes-related laboratory tests. The district had an ageing population and it was thought that pressure of numbers would be likely to increase to unmanageable proportions. A community care scheme was devised in which 97% of local GPs participated (Hill 1976a, 1976b). All newly diagnosed patients were referred to hospital for assessment and education. Uncomplicated non insulin treated diabetics were then returned to the care of their general practitioner but recalled for hospital review every 5 years. Target blood glucose levels were set and each patient was given a cooperation booklet, designed by a working party of the consultant and 3 GPs; this was published by Hoechst (Poole 1972) and contained educational information and space for medical follow-up notes (Upton 1975).

Patients attended the hospital laboratory for interval blood glucose estimation without an appointment. The results of these tests were made available to the relevant GP by the time patients were reviewed clinically. Postgraduate educational meetings were held for doctors, practice managers and nurses. A particular feature of the scheme was that GPs decided upon their own organisation of care. Most practices did not run mini-clinics, each doctor preferring, instead, to review

diabetic patients in a normal surgery (Hill 1976a, 1976b). GP anxiety about screening for diabetic eye disease lead to a pilot study in which high street opticians performed the necessary eye tests. The study showed that ophthalmic opticians could detect diabetic eye disease with a sensitivity and specificity of 78% (Hill 1981). As a result of this study, patients receiving GP follow-up were asked to attend an optician annually for retinal screening on the basis of which a record form was completed and returned to Dr Hill. If this examination revealed significant eye disease, the patient was recalled to the hospital retinal clinic.

On subsequent clinical review of community care patients in the hospital clinic 17% were judged by the consultant to have received unsatisfactory follow-up compared with 3.9% of those who had continued attending hospital (Hill 1978). It was also noted that 13% of patients failed to attend their GP when asked to do so. By 1983, the scheme had allowed the consultant to re-organise the two hospital diabetic clinics but no further formal evaluation of community diabetic care had then been published. One hospital clinic had been transformed into a retinal clinic, and the other clinic had became devoted to treating and monitoring complicated diabetics who could thereby be given more time than was previously possible.

Sheffield

Dr J Ward, the consultant in charge of the diabetic clinic in Sheffield in the mid 1970s, asked local GPs if they would be willing to take over the routine care of their non insulin treated patients. 75% of the GPs apparently agreed. Without any additional preparatory measures being taken, 1060 predominantly elderly NIDDM patients were discharged. After three years, half the discharged patients were surveyed by questionnaire and a smaller proportion were interviewed (Wilkes & Lawton 1980). 70% said they were pleased to have been discharged from the clinic but 20% of patients mistakenly thought their diabetes had been cured. 14% of the patients had not been reviewed once by their GP, and only 59% had been seen regularly. Nearly 30% of patients had a random blood glucose greater than 12.5 mmol/L. Overall, follow-up was judged to have been less than

satisfactory although no comparison was made with a hospital clinic group. As a result of this study a specialist diabetes nurse was employed as a facilitator to assist local GPs in setting up systems of diabetic care in their practices.

East Fife

The 1974 re-organisation of the NHS focused concern, particularly in Scotland, on the poor level of liaison and communication between primary and secondary care. The management of diabetes was one of the conditions singled out as requiring greater integration of primary and secondary care (Smith 1976). Discussion centred upon how to allocate specific responsibilities for delivering care between consultants, GPs, nurses, and patients themselves (Anon. 1976). More attention was to be paid to the educational needs of the carers and the channels of communication between them. A recent study undertaken to document the efficiency a hospital clinic was given renewed importance (Porter & Robertson 1972).

Following meetings between GPs, community nurses, and hospital clinic staff in Kirkcaldy it was proposed to discharge uncomplicated non insulin treated patients from the hospital diabetic clinic to their general practitioner. 58% of local GPs agreed to participate in this scheme and were sent a summary of the hospital diabetic record on their discharged patients. The summary included a date by which the consultant judged the patient should next be reviewed. Although the frequency of follow-up visits was left to the GP to decide, those without an organised system could request their patients to be recalled for review in the practice by an administrative recall system run by the hospital. The content of GP review was not specified but it was requested that at each diabetic review the GP fill out the relevant sections of a special diabetic record supplied by the hospital. A copy of this record was then returned to the hospital and placed in the hospital case notes. No special arrangements were made to facilitate blood glucose estimations in the community group but all the discharged patients were to be recalled annually for hospital clinic assessment and retinal examination.

The working of this scheme was evaluated in a randomised controlled trial, 197 hospital clinic attenders being allocated to community care or to continue at the hospital clinic as controls. After two years both process of care, and outcome, were assessed (Porter 1979). On average, the GP group received less routine care than the hospital group as judged by frequency of relevant diabetes care measures such as symptom assessments, weight measurements, urine or blood glucose tests. However, there was no demonstrable difference in health outcome as judged by recorded diabetic complications, sight threatening retinopathy, or in diabetic control assessed in terms of weight, glycosuria readings, and mean random blood glucose levels. Though 17 of the community care patients had died by the end of the study compared to only 8 of the hospital group, this did not reach statistical significance. It was concluded that integrated community diabetic care was an acceptable option and that the health of the community group was not compromised. This interpretation was tempered, however, by the non significant difference in mortality in the two groups.

Cardiff

In 1978 Hayes and Harries presented an interim report of a study in which hospital clinic patients with NIDDM had been randomly allocated to GP follow-up or continuing hospital care. Only 2 practices opted out of this study and the participating GPs were each sent guidelines explaining the basis of good diabetic care. GPs could refer patients to the hospital dietitians and chiropodists, and blood glucose estimations were available via the hospital laboratory. Although no educational courses were arranged for the GPs they were provided with specially designed patient records to facilitate follow-up.

After 2 years of observation the hospital admission rate for all reasons in controls was half that of the GP group but the difference was not statistically significant. In addition, there had been 3 deaths in the hospital group and 9 in the GP group. Again, this difference in mortality had not reached statistical significance at the time of the report (Hayes and Harries 1978).

INTERPRETATION OF THESE STUDIES

It was difficult to digest the implications of these initiatives in 1983. Reports from Wolverhampton had clearly shown that the attendance rate of patients cared for in mini-clinics was very much better than that in the hospital clinic. However, there were not, as yet, any measures of comparison of process of care, or of health outcome with those of a hospital clinic group. On the other hand, the comparative study from Kirkcaldy had shown considerably poorer process of care measures in the GP patients, but this had been in the context of non mini-clinic care. Despite worse process of care in the GP group, the study had not found a difference in health outcome though a statistically non significant disparity in all-reason mortality was noted.

In Sheffield, the discharge of diabetic patients from a hospital diabetic clinic appeared to have taken place without appropriate preparation and without the active participation of GPs. It consequently resulted in low diabetic review rates and inadequate supervision. The impression was gained that about 20% of the patients did not understand why they had been discharged from the hospital clinic, and had apparently interpreted their discharge to mean they were cured of diabetes. Interim results from Cardiff, where patients had been discharged to non mini-clinic care, showed a higher all-cause admission rate and death rate in the GP group, though this too had not reached statistical significance at that time.

Descriptive reports from Poole had suggested that predominantly non mini-clinic community care functioned well there, the consultant having noted a fall in emergency admissions for uncontrolled diabetes since the establishment of the scheme. But he had also noted unsatisfactory follow-up in 17% of GP patients though no further evaluation of process of care, or health outcome, had been published by 1983.

FURTHER STUDIES FROM GENERAL PRACTICE

Single practice studies

In 1971 Malins and Stuart described holding an annual diabetic clinic in a four partner practice in Birmingham. The clinic was staffed by 2 consultant physicians, a senior registrar, a nursing sister and technician together with four general practitioners. 80% of the registered diabetics attended this practice clinic. Housebound patients received a home visit by the team at the end of the clinic. During a 12 month period, this approach to diabetic care resulted in only 6 of the practice's patients having to be seen in the hospital diabetic clinic and it proved popular with patients, GPs, and the hospital staff (Malins and Stuart 1971). A similar clinic was reported to be operation in 2 other practices in Birmingham but no further evaluation was ever published.

Subsequent studies of diabetic care in general practice tended to focus initially on the inadequacies of routine diabetic care (Doney 1976, Fletcher 1977, Kratky 1977). Various suggestions were made to improve the situation including the design of special record cards, enlisting more nursing help, and the creation of mini-clinics. In 1973, Wilks published an influential report on the care of diabetes in normal appointment surgeries in a single-handed Bristol practice. In his view diabetes was 'the ideal disease for the general practitioner to diagnose, observe and treat with interest'. He calculated that the extra work for him as a GP had been very slight, especially when viewed as a percentage of his normal workload, and it had saved the local hospital clinic 148 consultations in one year.

The first year of a diabetic clinic in a practice in Livingston was reported by Wrench in 1978 (Wrench 1978). Discussions were held with the local consultant diabetologist and it was agreed that both NIDDM and IDDM patients were to be followed up in a practice mini-clinic, but pregnant IDDMs and those under 16, together with patients who had significant complications were to continue attending the hospital clinic. 17% of the registered diabetics were found to be receiving no regular review from hospital or general practice. This

was remedied by mini-clinic follow-up; over a 12 month period, all the non hospital patients were seen at the mini-clinic but no other process of care measures were reported.

In 1982 Wojciechowski described setting up a diabetic mini-clinic in a small rural practice in South Wales. His descriptive study showed that the extra time involved in running a monthly diabetic clinic amounted to only 6 minutes per diabetic patient per month (Wojciechowski 1982).

Studies involving several practices

A non randomised study in 1979 by Yudkin et al identified 217 diabetic patients registered with 3 group practices (without diabetic mini-clinics) in East London (Yudkin et al 1980). Less than half these patients were attending a hospital diabetic clinic regularly, and the frequency of relevant diabetic review was much lower in the non hospital attending group. However, there was no difference in mean glycated haemoglobin between the two groups.

Studies in general practice generally attested to a poor level of attendance and process of care in unstructured GP care. They also showed that some GPs had established diabetic mini-clinics in their own practices. However, few studies provided much objective evidence for the belief that diabetic care in general practice could ensure adequate diabetic control. Some audits of GP care had shown that good process of care could be achieved, but the effects upon health outcome had not been defined, and the studies were all uncontrolled. An exception was provided by a study of 6 mini-clinic practices in Oxford, which showed that structured primary care could improve outcome measures (Muir et al 1982). The Oxford GPs were provided with simple management guidelines. Metabolic control in NIDDM patients improved, as judged by mean fasting blood glucose levels. However, the follow-up period in this study was only 12 months.

In summary, by 1983, any attempt to refashion the pattern of diabetic care in Islington away from hospital diabetic clinics and

towards general practice needed to take heed of this tapestry of studies. No definitive answer had emerged to the question of how well primary care of diabetes fared in comparison to that provided by traditional hospital clinics. In addition, the results of these initiatives had to be considered, at the time of their publication, in the context of growing awareness of the problems created by crowded and unmanageable hospital diabetic clinics, among which were documented poor process of care measures, brief consultation times and inadequate medical records (Porter & Robertson 1972, Yudkin et al 1980, Gillies-Reyburn & Murtomaa 1981, Cox 1983).
An additional factor to be considered was the finding that approximately half of all patients with known diabetes in a population were not regular attenders at hospital clinics (Doney 1976, Malone 1982, Yudkin et al 1980, Dornan et al 1983).

These findings suggested caution was appropriate in attempts to expand diabetic community care in Islington described in the next chapter.

Chapter 2:

Promoting mini-clinic care of Diabetes in Islington

The Second National Morbidity Survey had indicated that GP consultations by patients for diabetes were 2-3 times as likely to lead to a hospital referral than were consultations for chronic conditions such as asthma, hypertension, or ischaemic heart disease(National Morbidity Statistics from General Practice 1979). This difference could be accounted for by a variety of factors such as the complexity of the condition, and the established pattern of hospital-based diabetic care. It could also be the consequence of a low degree of confidence, on the part of GPs, in the medical management of the condition.

Rather than begin attempts to foster community care with the aim of discharging patients from hospital clinics, it seemed important to to encourage better primary care of those patients likely to be receiving no systematic monitoring (ie: non hospital clinic attenders). The development of community diabetic care in Islington was therefore deliberately uncoupled from the discharge of patients from hospital diabetic clinics. It was hoped this approach would allay the known anxieties of some local GPs who feared that the primary objective behind promoting community care might be the scaling down of hospital clinics.

The following aims were formulated for the improvement of diabetic care in Islington:

- To increase the amount of postgraduate education for GPs and practice nurses in the diagnosis, monitoring, and clinical management of diabetes
- To achieve informed agreement by local GPs that structured primary care of diabetes was desirable
- To design a diabetic record card which would help to structure GP review of diabetes
- To encourage the establishment of specific mini-clinics

in general practice for review of diabetes.

The perceived advantages of a mini-clinic approach to the improvement of diabetic care in general practice in Islington included the following organisational points:

- Setting up a mini-clinic was a definable intervention
- Promoting the establishment of discrete disease oriented sessions in general practice appeared conceptually easier than devising mechanisms to improve the quality of care of a single group of patients throughout the whole span of a general practice's activities
- On the analogy of a miniature hospital clinic, the diabetic mini-clinic looked familiar, and a mini-clinic approach to antenatl care had already been adopted by some practices locally
- Because a mini-clinic compressed diabetic care in both time and space within a regular session, it was thought that one GP, in the case of large partnerships, would be likely to take the lead role in establishing this service in each practice. It was thought that exerting an influence upon a fraction of local GPs was a more practicable option than trying to alter the practice of all GPs in the area
- A specific session devoted to the care of diabetes in general practice seemed to offer the best possibility of providing some practices with regular or occasional help. For example, a dietitian could be seconded to a practice when the clinic was running, or the Diabetes Liaison Sister could be asked to help in the training of practice nurses within a mini-clinic setting
- It was hoped that once a core number of practices had established diabetic mini-clinics these would provide a setting for other GPs or practice nurses to learn the organisational and clinical skills required to set up their own diabetic mini-clinics.

METHODS

Educational Meetings

Meetings were held, both in hospital and in health centres, to discuss the diagnosis of diabetes, its treatment, complications and monitoring. All GPs in the Whittington catchment were invited to

attend the hospital-based meetings (see Appendix 1). In the case of meetings in health centres, only GPs practising from within the centres, and on occasion, neighbouring GPs from local practices were invited. Meetings in hospital usually consisted of a lecture followed by discussion, whereas those in health centres tended to consist of informal but structured presentation by the author with discussion throughout the session.

Major themes of these meetings included the accumulating evidence for believing that good metabolic control was likely to delay, or prevent, many of the complications of the disease (Cahill et al 1976, Jarrett and Keen 1976, Engerman et al 1977, Pirart 1978, Tchobroutsky 1978, Eschwege et al 1979). The services available within the district health authority were publicised and the important contributions of dietitian, chiropodist and diabetes specialist nurse to the care of these patients were emphasised. Organisation of diabetic care at practice level and the concept of anticipatory care were frequently discussed, and the advantages of structuring care in a mini-clinic setting were explored by the author.

Registers

Practices were asked to create a list of their diabetic patients by monitoring repeat prescriptions, and by using doctor and receptionist memory. It was hoped that practice based lists of diabetic patients would be followed by audit of the medical notes to define the current patterns of care.

A hospital clinic register of patients was also compiled. This consisted of a list of names and addresses, date of birth, date of diagnosis, date of last attendance in the diabetic clinic, type of treatment and name of GP. Information retrieved from patient notes was accomplished at the Whittington Hospital more easily than at The Royal Northern Hospital. At the Whittington, patient records were filed separately from Main Patient Filing whereas notes from the Royal Northern Hospital had to be worked through systematically in order to find the diabetic records and retrieve the data. This task

took about 12 months. The data was entered into a database and lists of patients by GP were produced and then sent to each practice. A covering letter outlined various ways in which this information could be used within the practice, and GPs were also asked to return information about patients who had died or left the practice list, or changed address, so that the clinic register could be updated.

Facilitating structured review

One theme to emerge from the educational activities was that GPs and practice nurses frequently felt that a major difficulty in structuring diabetic care in general practice was the lack of a systematic approach to consultations. A frequent remark from primary carers was that they found it difficult to 'think diabetes' opportunistically when a diabetic patient happened to consult. When such situations arose, for example, GPs reported assessing one aspect of the disease and perhaps requesting a blood glucose estimation. At the same time, they were anxious about whether they had correctly identified the clinical priorities at the point at which the patient consulted.

This is a problem common to the management of any complex chronic disease, whether in a hospital outpatient department, or in general practice. However, it may seem more pervasive in primary care settings because of the wider variety of patient problems presented and the absence of a strong tradition of organising general medical practice in disease-orientated clinics. In addition, consultations in general practice are frequently less focused in nature than those in hospital clinics, and they are more determined by the agenda of the patient than by the agenda of the doctor. These differences would be expected to be more pronounced in the case of GPs running non-appointment surgeries as was the case in most practices in Islington during this period. Attempts to provide solutions to this particular difficulty have traditionally been sought from a combination of different aides-memoirs: by drawing up protocols of patient management (Hurwitz and Yudkin 1992), guidelines for clinical management, or structuring patient records to 'cue' the doctor or nurse to ask the most relevant questions and examine the

appropriate aspect of the patient. It was generally felt that a diabetes record card, compatible with GP notes, on the lines of a shared antenatal card, could help structure general practice diabetic assessments in Islington and enhance communication between primary and secondary care.

Design of a diabetic record card

In 1983 the author reviewed existing diabetic record cards in use in general practice at that time, and convened a local working party to consider various designs for a record card. This group consisted of a practice nurse, the diabetes liaison sister and the diabetes education nurse in Islington, and 4 general practitioners. It emerged from discussions that different practices were likely to use a diabetes record card in different ways. The following general specification for the card's design was defined:

- If the record was to promote structured diabetic care the design needed to encapsulate a set of guidelines on patient assessment and frequency of monitoring
- The size and format of the record needed to be compatible with 'Lloyd George' notes so that the card could be GP held (though some practices wished to use it as a patient held record)
- The diabetes record card needed to be large enough to contain about 10 years of data collected during routine monitoring in a primary health care setting.

Draft designs of a record card were piloted in local practices and the finished version printed and published by Islington Health Authority (Hurwitz 1984, Hurwitz and Richardson 1987, see Appendix 2 in pocket, and Appendix 3).

The *Islington Personal Diabetic Record Card* consists of 3 sections: initial assessment, follow-up, and annual review. The initial assessment includes the initial symptoms and presentation of diabetes (if known) together with the diagnostic blood glucose level for the patient concerned. Routine follow-up involves regular monitoring of weight, urinalysis for glucose, ketones and albumin, blood glucose (either laboratory or using a glucostix method), glycated haemoglobin, space for comment on the results of patient

self assessment, and the examination of blood pressure. Follow-up columns also contain space for the results of annual visual acuity tests and foot inspections. At each consultation, the relevant information can be recorded along one horizontal row, whereas trends over time may be examined by reading vertically from the top to the bottom of the entries for each variable.

The annual clinical review section is designed to prompt the GP to solicit information about the occurrence of hypoglycaemic episodes, whether there has been recent onset of symptoms such as chest pain or lower limb claudication, and if there are symptoms likely to be the result of autonomic neuropathy eg: impotence or diarrhoea. The annual review prompts GP examination of feet together with assessment of pulses, reflexes and sensation (usually only necessary in the absence of reflexes or if the patient complains of burning or numbness) as well as testing the visual acuity in each eye and performing dilated fundoscopy.

Although the record can be patient-held, the *Islington Personal Diabetic Record Card* contains no information about diabetes or how to contact local services likely to be of use to patients. To this extent, it is a record directed primarily towards influencing the clinical practice of GPs. Though it makes no specific recommendations about the frequency of patient review, by splitting the main body of the record into 'follow-up' and 'annual clinical review' it suggests the desirability of one comprehensive assessment per year and one or more shorter reviews. This design aimed to ensure that the record provided a framework for structuring care of patients without imposing too many fixed rules upon GPs about how often diabetics should be reviewed.

In making no distinction between insulin and non-insulin treated patients as some other records have done (eg: Poole 1972, Exeter 1987), the Islington record card is clearly designed to encompass the care of all patients with diabetes within a single common record. The explanatory leaflet (Appendix 3) produced to facilitate the adoption of the card points out that not all of each assessment

would necessarily be completed during a single consultation. Copies of this record card were sent to all local practices with the offer of further contact should the GPs concerned be interested in using the card in a mini-clinic setting.

RESULTS

These initiatives created much interest on the part of local GPs and practice nurses. Attendances at educational meetings were encouraging. Many practices created their own lists of diabetic patients which were then cross-tabulated with lists provided from the register compiled at the Whittington and Royal Northern Hospitals. However, the majority of local practices felt that a mini-clinic approach to diabetic care in general practice could not be adopted, at that time, due to lack of space or the absence of a practice nurse, or because the GPs concerned felt it was not an appropriate method of using resources.

Over the following 2 years, only 5 practices succeeded in setting up structured mini-clinic care of diabetes and they did so to differing degrees, and at their own pace. Three of the practices were based in health centres and two were housed in purpose-adapted, or purpose-built premises. All had employed or attached nurses, and all were training practices. The three practices working in health centres had access to chiropody and dietetic advice within their premises, whereas the remaining practices referred patients to the hospital based departments for these services.

The variability of the mini-clinic arrangements which were adopted are illustrated by the following brief descriptions:

- One 7 doctor group practice wished to avoid the possibility of a single partner becoming the resident diabetes expert by taking sole responsibility for running a monthly diabetic clinic. The practice elected, instead, to set up a 'diabetic day' (Koperski 1987) in which each partner reviewed their own diabetic patients. This practice had A4 records and developed their own in-house diabetes record, but adopted the *Islington Personal Diabetic Record Card* as a patient-held record.

- A GP trainee in a 6 doctor practice initiated a monthly diabetic clinic run by one partner and the trainee which adopted the *Islington Personal Diabetic Record Card* as the GP record.

- An 8 doctor practice set up a monthly diabetic clinic run by one GP and the practice nurse. They reviewed patients together for the first year and used the *Islington Personal Diabetic Record Card* as a patient-held record.

The five participating practices began mini-clinics at widely spaced intervals over a two year period, and maintained important differences in their attitudes towards the sort of patients they catered for. Some practices decided to commence structured care for patients who were not receiving care at a hospital clinic, while others decided to start by reviewing regular hospital attenders only because the partners wished to have the benefit of previous hospital clinic letters with the management orientations these might provide on each patient. Some practices started their structured review programme with non insulin treated patients only, others were prepared to review insulin treated patients in addition.

After two years, it seemed that a strategy which promoted the mini-clinic approach to general practice diabetic care in an area such as Islington was only be likely to appeal to well organised and successful practices, as judged by standards such as size of partnership, type of premises, and the presence of nurses and GP trainees within the practice (see Appendix 4). With the vast majority of local GPs still working single handed, from premises that were not purpose-designed and without nursing help, it appeared increasingly unlikely that many more practices would join the scheme.

A mini-clinic approach appeared to demand a very considerable effort on the part of the practice as a whole even for GPs without space constraints (Hurwitz 1986, Huntington et al 1986). Notwithstanding widespread interest in the *Islington Personal Diabetic Record Card*, the sophistication of its demands upon the doctor conducting a diabetic review made many GPs think twice about the work involved in both establishing and running, diabetic mini-clinics.

In 1985, it was decided to reconsider this approach to promoting GP diabetic locally. Could a different strategy be devised, which would involve less intensive effort on the part of GPs, and would appeal to a wider variety of practices? Any new approach towards meeting the broad aims of structured care of diabetes was to be aimed at supplementing, rather than replacing the mini-clinic initiative. By 1987, a further *two* practices had set up their own monthly diabetic mini-clinics and a descriptive analysis of patients reviewed in the 7 local mini-clinics by Spring 1987 was undertaken. The findings of this study are presented in Appendix 4.

Chapter 3:

Factors influencing the design of a new strategy for the primary care of Diabetes in Islington

INFLUENCES UPON DESIGN OF A NEW STRATEGY

In reconsidering the approach to be taken to promoting primary care of diabetes in Islington two key papers provided important findings (Hayes and Harries 1984, Singh et al 1984).

Singh et al reported a study designed to evaluate Thorn's mini-clinic initiative in Wolverhampton. The study consisted of a paired comparison of mini-clinic patients with patients who had continued to attend the hospital clinic. The mini-clinic patients were selected from the total group of patients discharged to the care of 23 participating practices over the period 1970-81. 221 patients were selected at random from a sub group of those who met the following criteria: regular mini-clinic attenders, caucasian aged 18-66, duration of diabetes ≥ 2 years, no change in diabetic treatment ≥ year. They were matched with hospital clinic patients for age, sex, duration of diabetes and type of treatment whether diet, oral hypoglycaemics, once daily or twice daily insulin.

Review of medical notes showed that over a three year period, 1980-1983, there was no difference in the number of blood glucose estimations requested in the two groups of patients except in two sub groups; mini-clinic patients on oral hypoglycaemics had received more blood glucose estimations than their hospital counterparts but the hospital clinic had requested significantly more blood glucose tests on the twice daily insulin group than the mini-clinic doctors. However, there were no significant differences between groups, whatever their treatment, in retrospective mean HbA_1, or prospective HbA_1.

One limitation of this study derives from the discharge policy of the Wolverhampton hospital diabetic clinic. A criterion for eligibility for discharge to mini-clinic care was that patients

should have been regular hospital clinic attenders. Mini-clinic patients were therefore a selective population biased by a record of good attendance. Therefore the mini-clinic study sample, though randomly attained, was nevertheless selected from a group of regular attenders. They were matched with a group of hospital clinic attenders who were not apparently selected from a group of regular attenders. This made it likely that the mini-clinic patients were more compliant than their hospital clinic counterparts. In addition, it was not clear from the report whether matched hospital clinic patients included any diabetics registered with participating mini-clinic practices, who would be expected to be more complex patients with worse control given the discharge policy of the hospital clinic already mentioned.

Despite the study's possible sources of bias, and the lack of additional process of care or outcome measures, the Wolverhampton study demonstrated more definitively than had hitherto been achieved, that mini-clinic care can result in comparable glycaemic control to that achieved by a hospital diabetic clinic.

Process and outcome measures of routine GP care

The paper by Hayes & Harries (1984), published in the same issue of the *British Medical Journal*, reported the results from Cardiff of a 5 year prospective study of 200 non insulin treated patients randomised to routine care in general practice versus continuing care in a hospital clinic. This showed that follow-up and supervision of care in the GP group had been inadequate, with only 13.6% of patients having received annual diabetic review in general practice and only 4.8% having had annual blood glucose estimations. This compared with 97% of the hospital group having been reviewed at least annually, including blood glucose tests. Only 3 patients in the hospital group were lost to follow-up compared with 9 in the GP group. No statistical difference in the number of hospital admissions for a medical reason was noted but 18 patients in the GP group died compared with 6 in the hospital group. This difference in mortality reached statistical significance and was mainly accounted for by an excess of cardiovascular deaths in the GP group. The

authors concluded that

> 'simple transfer of responsibility for continuing care from hospital clinics to general practice is unlikely to maintain an adequate standard of care.'

These studies formally confirmed that structured GP care in the form of mini-clinics could be effective, while routine care by GPs was not (Hurwitz and Yudkin 1984, Pietroni 1984). But in the context of inner London, it had not proved possible to persuade a significant number of GPs in Islington to adopt a mini-clinic model of care.

Could a system of structured diabetic care be devised which would be compatible with review in normal surgery time? The Cardiff group had suggested that a computerised system to ensure appropriate follow-up and review of diabetics by GPs might help. In their view, such a system could

> 'recall the patients to see their general practitioner at regular intervals, warn ... and request ... both clinical information and blood for estimation of glycosylated haemoglobin concentration'.

The clinical needs of patients with Type II diabetes and the organisational problems faced by GPs in general were reconsidered. With little confidence amongst most of the GPs in insulin adjustment or retinal screening, and without the 'protected time' provided by a mini-clinic to develop such skills, it was decided to develop the Cardiff vision of a recall system in Islington, but to confine such a scheme to non insulin treated patients, and to provide retinal screening elsewhere.

The following possible methods of providing retinal screening were examined:

- Annual recall to the hospital diabetic clinic for retinal screening only. This would need to be carefully coordinated at the hospital end, to ensure patients were not incorporated into the ordinary clinic. This idea seemed to run counter to the philosophy of a primary care diabetic service based in the community rather than in hospital.

- Similar considerations applied to using a non-mydriatic retinal camera based in the hospital to screen for eye disease, though it was decided to offer this option to existing mini-clinic practices as a pilot study (Rogers

et al 1990).

- Hill had shown in a small study that opticians could detect serious diabetic retinopathy with a sensitivity and specificity of 70% (Hill 1978). A subsequent study in Bristol involved all the opticians in the Frenchay district and showed that opticians could screen for diabetic retinopathy with a sensitivity of 87% and a specificity of over 90% (Burns-Cox et al 1985, Bhopal and Hedley 1985). It was felt that if optometrists in Islington could be interested in developing a retinal screening service to include dilated fundoscopy, this would offer the best long term solution to provision of a service in the community which, if successful, could accommodate large numbers of patients.

The design and development of a prompting system for ensuring community diabetic care in Islington was based upon guidelines already in use in Whittington Hospital diabetic clinic; its design, development and evaluation are described in Section III.

SECTION III

Prompting care of diabetes in Islington: 1987-90.

SECTION III

Chapter 4:
Design of a system for prompting community diabetic care.

The idea of prompting diabetic care in the community arose from the work of Hayes and Harries (1984). Their suggestion had been designed to remedy repeated findings from studies which had shown poor process of diabetic care measures in general practice (discussed in Section II). In creating a prompting system that would choreograph community diabetic care in Islington the intention has been to facilitate patient attendance for appropriate laboratory tests and structured clinical assessments by GPs and optometrists according to a standard pattern. The design and operation of the resultant prompting scheme is discussed in the present tense because this method of care is still ongoing. The evaluation of the scheme, by randomised controlled trial, was devised in 1986 and set up in 1987. The evaluation was executed between March 1988 and the end of October 1990 and is therefore discussed in the past tense.

Aims of the prompting system

The approach taken has been to mirror in primary care the intensity and frequency of clinical assessment, monitoring, and treatment, provided in hospital diabetic clinics. The aims are:

- to ensure that patients with Type II diabetes followed up in the community receive a similar standard of care to that provided in hospital diabetic clinics of the DGH
- to ensure that dietary advice and chiropody treatment are available and accessible to patients followed up in primary care
- to ensure easy referral of community care patients to and from hospital diabetic clinics if indicated.

As with the design of the *Islington Personal Diabetic Record Card*, the prompting system is based upon existing guidelines for the hospital care of diabetes used in the outpatient clinics of the DGH (Whittington Hospital c. 1981). Prompting incorporates the concept of *annual review* involving measurement of weight, glycaemic control,

urinary albumin, blood pressure, foot examination to check for signs of ischaemia and neuropathy, and examination of visual acuity and retinoscopy through dilated pupils. The system reflects the hospital clinic practice of alternating an *annual review* of the patient with a *regular review* which includes all the above assessments except foot and eye examinations.

Objectives of the prompting system

The objectives of the prompting system are:

- to prompt patients for 6 monthly blood tests for random plasma glucose, HbA1 and albuminuria estimations
- to feed back to GPs the test results in time for them to be available when patients received clinical review of diabetes
- to structure GP diabetic reviews to conform with the hospital guidelines of good diabetic care
- to ensure 6 monthly diabetic review of patients by general practitioners consisting of alternate '*annual review*' (but omitting the eye check) and '*regular review*'
- to prompt patients for annual retinal screening by high street optometrists to include measurement of visual acuity and dilated fundoscopy
- to facilitate appropriate contact between patients, the hospital diabetic or ophthalmic clinics, dietitians and chiropodists.

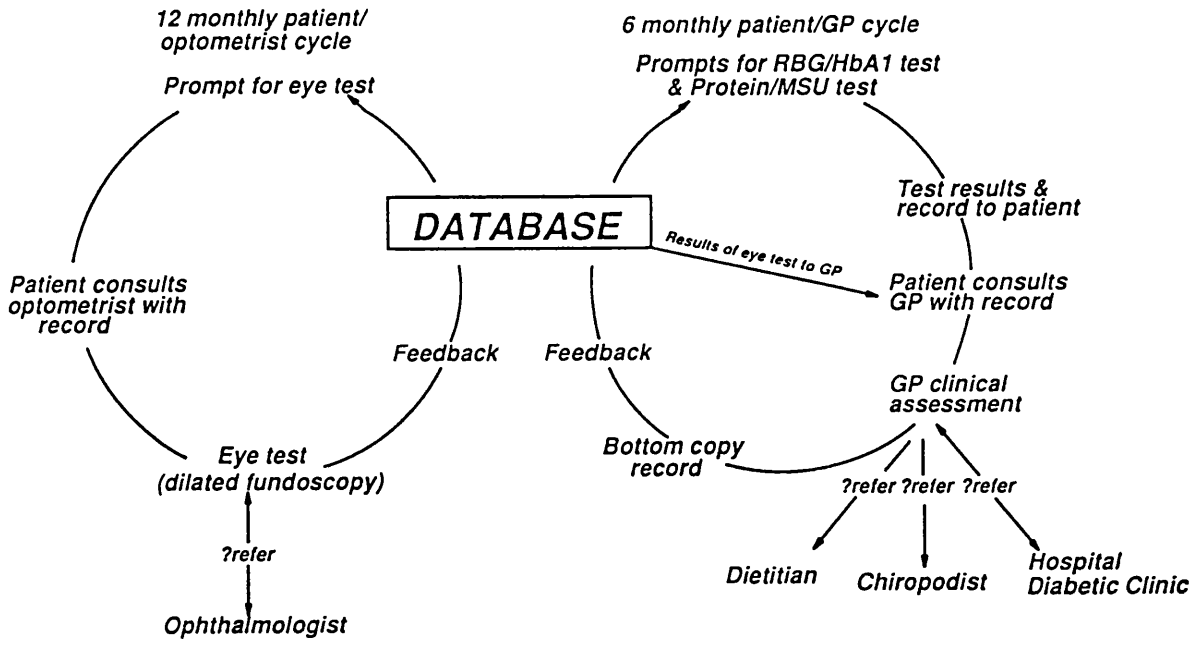
Though the idea of prompting is not derivative of hospital clinic practices or procedures, it is important to state explicitly that the *concept* of care underlying the aims and objectives of prompted care is modelled on that provided by the hospital clinic. In aiming to match the process of care in the community to that which occurs in the hospital, it was hoped that a similar standard of care could be achieved in the two settings. It is appropriate to use the standard of care provided by the hospital clinic as a benchmark because, although it has not itself been independently validated, it has developed and has been maintained through normal professional mechanisms, by consultant peer review within hospitals, and it reflects generally accepted guidelines for good practice, as

subsequently advocated, for example, by the British Diabetic Association (British Diabetic Association 1990a, 1990b).

Prompting system design

At the centre of the system is a database which sends requests to patients asking them to provide blood and urine samples for random plasma glucose, glycated haemoglobin (HbA_1), and albuminuria estimations (Figure 2). The samples can be taken in general practice, at a nearby health centre, or at a hospital laboratory, whichever is most convenient to the patient. All the tests are analysed by one DGH laboratory and the results are captured by the database and incorporated within personalised medical records which serve as clinical review forms. The review forms are sent to patients, who are asked to attend their GP for clinical review within 10 days, and to take along the review form when they consult.

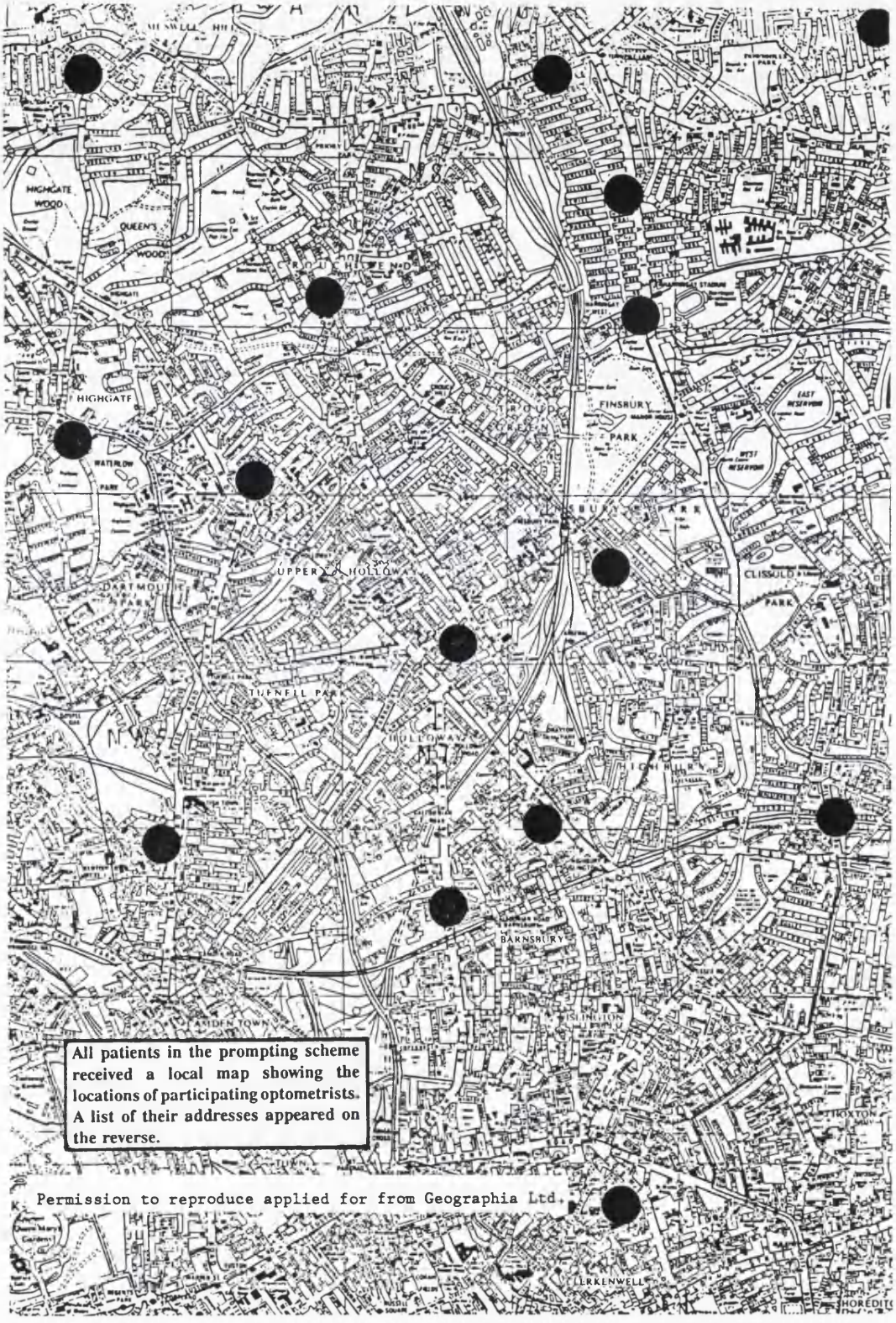
Figure 2: Design of prompted care.



Patients not already under the care of a hospital eye clinic receive annual requests to visit one of a number of participating optometrists. A map showing name, address and location of optometrists who perform refraction and dilated fundoscopy is

included with each eye test prompt. A copy of this map excluding the names and addresses is shown in Figure 3 below.

Figure 3: Map showing location of participating optometrists.



The personalised medical and eye review forms were developed and presented to local general practitioners and optometrists in 1987. Revisions were made in the light of their comments. The GP review forms include past relevant clinical and biochemical information about patients' diabetes, including an updated complication list where known (Figure 4).

Figure 4: GP prompted clinical review/feedback form.

ISLINGTON DIABETIC SHARED CARE SCHEME - GP CLINICAL REVIEW FEEDBACK FORM - ANNUAL REVIEW Number

Dr L Fine 15 Watling Street London N1	Tommy Smith 1 Islington Green London N1
	Date of Birth [15 / 2 /30] Year of Diagnosis [1980]
	Last Annual Review [15 / 9 /89] Last Retinal Screening [2 / 8 /89]

BIOCHEMICAL DATA	15/3/90	28/8/90	*MEAN
RBG	12.3	10.2	9.8
HbA1	9.4	9.0	8.9
Creatinine	120	114	
Albuminuria	+	Trace	
MSU	Sterile	Sterile	

Date	Complication	Date	Complication
1985	Angina		
1988	Proteinuria		
1988	Hypertension		
1989	Cataract		

Regular Review ALWAYS COMPLETE THIS SECTION see [•] below below

1 Date of Review [/ /]

2 Weight [ ]Kg

3 Blood Pressure [/]mmHg

Name of doctor who reviewed the patient on this occasion

Annual Review COMPLETE THIS SECTION TODAY see [•]

	YES	NO
A Lower Limb Neuropathy	[ ]	[ ]
B Foot Ischaemia	[ ]	[ ]
C Any other Diabetic Complications	[ ]	[ ]

Current Treatment

Referral needed to: (when making a referral, please include a separate letter together with the form)

Dietitian [ ] Chiropodist [ ] Diabetic Clinic [ ]

Please keep the front copy and return the back copy in the attached SAE to:

Diabetic Unit, Whittington Hospital, Archway Wing, London, N19 5NF

[•] NOTES FOR THE GENERAL PRACTITIONER ON THE REVIEW FEEDBACK FORM

Biochemical Status and Control

*MEAN = Average of previous values excluding most recent value

	RBG	HbA1
Good Control	4 - 8mmol/l	< 9%
Moderate Control	8 - 12mmol/l	9 - 10.5%
Poor Control	> 12mmol/l	> 10.5%

2 Please weigh without shoes or jacket/coat each time

3 Hypertension - treat if diastolic > 100mmHg (phase v)

A Absent ankle jerks and reduced foot sensation
B Loss of two or more foot pulses
C E.g. Ulcers, Sweating, etc.

If any of the referral boxes are ticked an appointment will be sent to the patient automatically

Each review form contains a set of brief operational definitions of diabetic complications including hypertension, lower limb neuropathy and ischaemia together with a guide to interpreting random plasma glucose and glycated haemoglobin levels. The optical review form includes values of previous visual acuities and retinal and lens assessments, if available. All clinical review forms are self-copying and copies completed during clinical assessments are returned to the database to update longitudinal records on each patient.

Prompted clinical assessments

The prompted *regular review* parallels hospital clinic *regular review*; it involves measurement of weight and blood pressure, assessment of diabetic control and treatment on the basis of recent and previous random plasma glucose and HbA1 estimations. If albuminuria is detected the result of a midstream urine culture is also included in the personalised review form. In addition to these checks, prompted *annual review* includes inspection of feet and examination of foot pulses and ankle jerks. Referral to dietitian, chiropodist or hospital diabetic clinic is arranged by the database if the doctor ticks the appropriate box on the review form.

Figure 5: Optometry review/feedback form.

ISLINGTON DIABETIC SHARED CARE SCHEME — OPTOMETRIST REVIEW — Review No

GP Dr L Fine
Address 15 Watling Street, London N1
Phone

Patient Tommy Smith
Address 1 Islington Green
London N1

Date of Birth 15/2/30 Year Diagnosed 1980 Treatment Now Tablets

Optometrist
Address

Today's Date
Phone

	24/8/88		2/8/89		TODAY	
	R	L	R	L	R	L
CORRECTED VISUAL ACUITY	6/9	6/5	6/12	6/5		
Retina.....normal	YES	YES	YES	YES		
Background Retinopathy						
Pre-proliferative Retinopathy						
Proliferative Retinopathy						
Maculopathy						
Previous Laser Treatment						
LENS.....normal	YES	YES		YES		
Opacity Early/Advanced			E			
Peripheral/Centre/Diffuse			P			

REFERRAL - If required, State reasons

Please detatch along perforations and return the bottom copy in the attached SAE to:

Diabetic Unit, Whittington Hospital, Archway Wing, London N19 5NF

The patient's General Practitioner will be informed of the results of your examination.

With the approval of participating GPs, optometrists may refer patients directly to the hospital ophthalmic clinic for further assessment by ticking the box on the optical review form as a result of which the prompting database generates a letter of referral (see Figure 6); further variants of all the referral letters which the database generates appear in Appendix 5.

Patients referred to hospital diabetic clinics are assessed in the context of the community care scheme. Further hospital clinic follow-up would usually be arranged only where there is a particular need, otherwise the patient is discharged back to prompted community care.

Figure 6: Sample ophthalmology referral letter (see Appendix 5).

Whittington Hospital

Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

Miss Claire Davey
Consultant Ophthalmologist
Whittington Hospital
St Mary's Wing

Dear Claire,

RE:

This non-insulin treated diabetic patient has been assessed by an optometrist participating in Community Diabetic Care, and has been referred for review in ophthalmology outpatients. Please send the patient an appointment.

The patient has had diabetes for ..... and has the following complications.....

and is on the following drugs .....

I enclose a copy of the optometrist's findings.

Please reply to Community Diabetic Care, c/o Dr John Yudkin, Diabetic Office, Archway Wing and send copies to the optometrist and GP.

Yours sincerely

Dr John S Yudkin
Consultant Physician in Charge Diabetic Clinic

ENC:

Prompting cycles

Each patient's prompting cycle starts at fixed 6 monthly intervals with requests sent from the database to the patient for blood and urine tests. As soon as the test results are received by the database a *regular* or *annual* review form is despatched to the patient, whichever is due. When a copy of the clinical review form is returned by the GP it is checked for completeness. If referral to a chiropodist or dietitian has been requested, a standard letter containing brief patient details is produced requesting an appointment for the patient to be seen (see Appendix 5). If the GP has requested that a patient be reviewed in the hospital diabetic clinic a copy of the GP's review form, together with any covering letter, is placed in the patient's hospital notes. In addition, a label is stuck in the outpatient notes (Figure 7) informing the clinic doctor that this patient is usually cared for within the prompted community care scheme and emphasising the importance of the doctor explaining to the patient where future follow-up is to occur.

Figure 7:Label placed in hospital notes of patients referred to hospital diabetic clinics from within the prompting system.

DATE:
TO: Diabetic Clinic Doctor FROM: Dr John S Yudkin

This patient is under GP care for diabetes and has recently attended for GP diabetic review. The GP has referred the patient to the Diabetic Clinic on this occasion. **Please look at the GP's clinical review form filed in these notes and discuss your review of the patient with JY.**

Please tell the patient clearly whether they are to be returned to GP care immediately, or reviewed again in the Clinic.

**Write back to the GP and send a copy of this letter to: Community Diabetic Care,
Diabetic Office,
Whittington Hospital**

The optometry prompt is sent annually. On receipt of a copy of the optometry assessment the database sends a copy of the findings to the patient's GP, who is thereby kept informed of eye findings.

The prompting cycles were further specified by the following rules governing reminders:

Blood & urine tests

A reminder is sent to the patient with further test forms if the results of the estimations are not received by the database within 3 weeks of initial despatch. A further reminder is sent after the same interval if necessary. If there is still no response after 3 weeks the patient's GP is informed and the next prompt for blood and urine tests commences 6 months from the initial prompt in this cycle.

GP assessment prompts

If a copy of the GP's clinical review form is not received within 2 weeks of despatching the prompt, the doctor is telephoned to ascertain whether the patient has attended for clinical review or not. If the assessment has been performed a copy of the review form is requested. If the patient has not yet attended for GP clinical review a reminder is sent. If there is still no response the patient is not prompted again until the next set of laboratory tests are due 6 months hence.

Optometry assessment prompts

Lack of feedback of the optometry clinical review form within six weeks leads to a reminder prompt to the patient. If there is no further response the patient is next prompted for an eye assessment 6 months hence (rather than 12 months).

System override

The following system override rules provide a safety-net against potentially serious loss of glycaemic control in prompted patients:

> A random plasma glucose level between 20.1-24.9 mmol/L results in the patient receiving a GP review prompt with a covering letter advising attendance at the GP surgery within 3 days rather than the more usual 10 days.
>
> A random plasma glucose ≥ 25 mmol/L results in the database sending an urgent hospital diabetic clinic appointment to the patient rather than a GP review prompt.

The frequency of prompting can be varied; if GP feedback indicates that subsequent clinical review is desirable sooner than the routine of 6 months, the database issues the next prompt at the earlier time suggested by the doctor. Prompting is suspended for patients who have been referred to the hospital diabetic clinic until discharge from outpatients, at which point it is resumed after 3 months.

The nature of the database

For the period of its development and evaluation, the database was a paper-driven system consisting of card indexes and files. It was operated by a part-time research officer working in the diabetic and endocrine laboratory of the Whittington Hospital according to a written protocol (see Appendix 6). The research officer was supervised by the author who examined all copies of the clinical review forms and took medical responsibility for the operation of the prompting system. Other than to operate the system's override rules and to ensure that patients who changed their mind about accepting prompted care were not subsequently prompted (see chapter 5), at no time did the author have to intervene in the operation of the prompting cycles.

Chapter 5:
Evaluation of prompted GP diabetic care in Islington - a pilot project.

INTRODUCTION

As the general aim of prompted care was to match in the community the standard of care provided by hospital clinics, a randomised study design offered the most powerful method of comparing the effectiveness of these two alternative health care packages. Because the promotion of better primary care of diabetes in Islington had been uncoupled from a hospital clinic discharge policy, the fact that this evaluation study would necessarily halve the number of patients who could be discharged from hospital outpatients was not a major consideration (see Section II).

The *objective* of the evaluation was:

> **to evaluate the medical effectiveness and acceptability of the prompting system for coordinating community care of non insulin treated diabetics.**

A prospective randomised single centre trial was proposed, with patients recruited from the hospital diabetic clinics and allocated either to prompted care in the community, or to continued attendance at the hospital clinic. Two aspects of the effectiveness of the prompted care package were the main focus of the study, the process of diabetic care, and medical outcome. It is important to note at this stage that both care packages allowed for 'cross-over' consultations: patients in the prompted group could be referred to hospital diabetic outpatients, and subjects in the control group could consult their own general practitioner for a diabetes-related reason.

The *Null Hypothesis* to be tested was:

> **there is no difference in process of medical care measures or medical outcome between the prompted community care package and the hospital clinic care package.**

The acceptability of prompted care to patients and health care providers would be investigated by questionnaire.

Size of the study

Funding for this trial would permit a study duration of approximately two years. It was therefore decided to base calculations of the size of the study upon the most important and objective outcome measures available. Because glycaemic control is a predictor of diabetic outcome and also provides some measure of quality of care, mean glycated haemoglobin levels were chosen as the outcome variable upon which to calculate trial size. Only one hospital laboratory was to be responsible for HbA_1 estimations which were to be performed by agar gel electrophoresis (Corning Ltd., Halstead, Essex). In view of the proposal to recruit non-insulin treated patients from the hospital diabetic clinic the mean HbA_1 and its standard deviation were computed from a sample of patients (n=40) judged suitable for discharge according to generally accepted criteria (see below).

The required number of patients in each arm of the trial was calculated from the formula:

$n = 2\ \sigma^2/(\mu_1 - \mu_2)^2 \times f(\alpha,\beta)$ (Pocock 1983)

n = number of patients in each arm of the trial

μ = anticipated mean value of interest in each arm of the trial

σ = standard deviation of μ

α = *type I* error viz: the probability of detecting a significant difference between μ_1 & μ_2 if there were no difference in the treatment arms of the trial ie: risk of a false positive result.

β = *type II* error viz: the probability of not detecting a difference between μ_1 & μ_2 where there really is a difference ie: risk of false negative result.

$f(\alpha,\beta)$ can be read off Table 9.1 of Pocock's textbook *Clinical Trials* (Pocock 1983) according to different values of α & β.

Setting $\alpha = 0.05$, the level of the two sample t test to be used to test any difference found between μ_1 & μ_2 at the end of the study and setting β to 0.1 or 0.2 (resulting in a 90% or 80% power

respectively) results in $f(\alpha,\beta) = 10.5$ or 7.9 for a two tailed *t* test (or a χ^2 test in the case of differences in proportions).

The mean HbA_1 of the sample of patients discussed above came to 10.2% with standard deviation $\sigma = 2.2\%$. It was considered that a 10% rise in this mean HbA_1 level would represent a significant clinical deterioration in the discharged (prompted) group and would need to be detected by the trial. If $\mu_1 = 10.2\%$ $\mu_2 = 11.22\%$, then the difference to be detected $(\mu_1 - \mu_2) = 1.02$. Substituting the following values in the above formula

For 90% power

$n = 2 \times 2.2^2/1.02^2 \times 10.5 = 97.7$

For 80% power:

$n = 2 \times 2.2^2/1.02^2 \times 7.9 = 76.5$

Using the mean level of HbA_1 as the most important indicator of medical outcome to calculate the size of the trial, given the above considerations, meant that 180-200 patients would allow detection of a significant loss of glycaemic control in the prompted group.

With about 90 patients in each arm, the size of the difference in mean random plasma glucose detectable can be computed:

Mean random plasma glucose in above sample of 40 Type II patients attending the hospital clinic = 9.5 mmol/L

Standard deviation = 3.9

For 90% power:

$(\mu_1 - \mu_2) \approx \sqrt{(2 \times 3.9^2/90 \times 10.5)} = 1.9$ mmol/L

For 80% power:

$(\mu_1 - \mu_2) \approx \sqrt{(2 \times 3.9^2/90 \times 7.9)} = 1.6$ mmol/L.

A deterioration of mean random plasma glucose between the control and prompted groups from approximately 9.5 mmol/L to between 11.1-11.4 mmol/L could therefore be detected by a trial of approximately 180 patients.

These calculations resulted in a required sample not dissimilar in size from the number of patients recruited by the only two other randomised studies of the discharge of diabetic patients from hospital clinics that had then been published; 197 in Kirkcaldy (Porter 1982), and 200 in Cardiff (Hayes and Harries 1984). These studies were relevant to estimating the effect of possible non compliance on trial size. It was reasonable to assume that about 90% of patients in the control group would be reviewed at least once a year in hospital diabetic clinics because this would be in line with known loss to follow-up in the hospital clinics of about 10% annually. It was difficult to estimate the proportion of patients likely to receive at least annual GP diabetic assessment as a result of prompts, because the prompting system was designed to result in a considerable improvement on the Cardiff findings of only 14% of patients who received GP review of diabetes annually in that study. However, it was impossible to know whether prompting could match the Kirkcaldy figures of 71% of patients who attended their GP for review of diabetes in the first year, and 59% in the second year of a two year study. On the assumption that prompting GP care in Islington could match the better of the Kirkcaldy figures, the size of the trial needed to detect this difference in the Islington study is given by

$$n = p_1 \times \frac{(100-p_1) + p_2\,(100-p_2)}{(p_1-p_2)^2} \times f(\alpha,\beta)$$

$p_1 = 90\%$ $p_2 = 70\%$

For 90% power n = 78 in each group

For 80% power n = 59 in each group.

In view of all the above considerations it was decided to recruit between 180-200 patients. The study was approved by the Islington District Ethical Committee for Clinical Research on 24 December 1986.

Recruitment of GPs & Optometrists

In the Spring of 1987 the Local Medical and Local Optical Committees

were contacted with details of the proposed study. Both Committees approved its aims and objectives. The Secretary of the Local Optical Committee observed that if only a proportion of local optometrists volunteered to participate in the study it would be ethically acceptable for patients to be informed which particular optometrists had an interest in detecting diabetic eye disease. The Camden & Islington and the Haringey Family Practitioner Committees (now renamed Family Health Services Authorities) were notified of the study and agreed to provide information on any deaths and departures of study patients.

In the Spring of 1987 local GPs were invited to attend educational updating sessions on the management of diabetes and asked to take part in the pilot study. Seminars were held later in the year at which the prompting system was explained (see Appendix 7). Practices agreeing to take part were sent a manual of blank prompts with examples of how to fill out the clinical review forms (Appendix 8). In September 1987, a meeting organised jointly under the auspices of the Whittington Hospital Diabetic Unit and The City University Department of Optometry & Visual Science provided interested optometrists with demonstrations and practical experience of detecting diabetic retinopathy; the importance of dilating pupils was emphasised and appearances and definitions of the different types of retinopathy illustrated (see Appendix 7). A short textbook of diabetic eye disease (Kritzinger and Taylor 1984) was sent to each of the optometrists who agreed to participate in the study, together with accepted definitions of the appearances of diabetic retinopathy and a brief manual explaining how the prompting system was to work (see Appendix 9).

Over the succeeding 18 months 38 general practices agreed to take part in the study, including 15 single-handed and 13 two doctor practices (see Table 1).

TABLE 1: Participating practices by partnership size

Partnership sizes	Number of practices involved	Total number of GPs
Single-handed	15	15
Two doctors	13	26
Three doctors	3	9
Four doctors	7	28
Total	38	78

All of these practices had patients who attended either the Whittington or Royal Northern Hospital diabetic clinics. Of the 38 participating practices 25 (66%) were situated geographically within Islington, 10 were in Haringey near its border with Islington, and 3 practices were in Camden. Not all the GPs in each participating practice contributed patients to the study. However, if the partners shared their medical lists the partnership as a whole had to agree to participate even though only a few patients from one partner's list might be involved.

14 optometrists working in 15 locations agreed to provide retinal screening (see Figure 3).

Recruitment of patients

Patients were recruited from the two hospital diabetic clinics if they met accepted criteria for community diabetic care. Criteria for ***inclusion*** were:

* Non insulin treated
* Aged under 80 years
* Mobile (i.e. not housebound)
* Reviewed in a hospital diabetic clinic in previous 2 years

Criteria for ***exclusion*** were:

* Women aged < 47 years to avoid the possibility of insulin treatment in the event of pregnancy

* Patients with the following established diabetic complications:
  - nephropathy with creatinine > 150μmol/L

- ischaemia severe enough to have resulted in gangrene or amputation

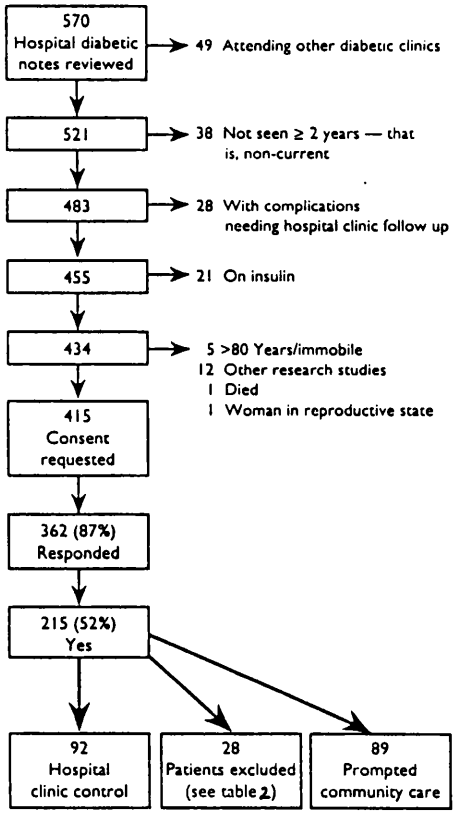
- retinopathy worse than background in one eye.

Patients were identified by examination of the hospital notes of 570 clinic attenders registered with participating practices. The numbers of excluded patients together with the reasons for exclusion are shown in Figure 8.

415 patients whose hospital notes indicated that they would meet the above criteria were approached for their written informed consent to take part in the study (see Appendix 10).

212 (52%) of these patients agreed to participate, of whom 209 were randomised using the Cambridge Tables of random numbers. There were no significant differences in the sex or mean age of patients who consented to inclusion in the study and those who did not.

Figure 8: Composition of study groups and reasons for exclusion from study



After randomisation and before prompting had commenced, a further 28 patients were excluded from the study (13 who had been allocated to prompting, 15 who had been allocated to the control group) for reasons documented in Table 2 overleaf.

TABLE 2: Patients found to be ineligible after informed consent and randomisation

Reason ineligible	Number of Patients
Not seen in hospital clinic > 2 years at start of study	17
Withdrew consent before prompting started	3
Found to be on insulin at start of study	5
Significant nephropathy at start of study	1
Moved out of locality by start of study	1
Previous hospital notes lost at start of study	1
Total	28

Prior to randomisation, baseline data were extracted from each patient's hospital notes. The following operational definitions were adopted for the purposes of data collection from hospital notes:

Ischaemic heart disease - any reference to this condition or history of myocardial infarction or angina or evidence of heart failure without another cause

Neuropathy - evidence of loss of both ankle reflexes and reduced foot sensation or reference to neuropathic foot ulcer

Leg ischaemia - evidence of loss of two or more foot pulses or reference to ischaemic foot ulcer.

Randomisation resulted in 89 eligible patients allocated to prompted care and 92 to remain as controls in one of the hospital diabetic clinics. Prompting commenced in the community group in April 1988 and recruitment continued over the following year. Patients were phased in to prompting according to when their next hospital clinic appointment would have been due (had they not consented to take part in this trial). The study continued for a total of 2 years and 6 months (median of 2 years) at the end of which the patients' hospital and GP notes were reviewed together with records of prompted clinical and eye review. Information on mortality was collected from GP notes, hospital information systems and returns from Family Practitioner Committees.

The trial finished on 31st Oct 1990. Data collected was analysed on a database (SMART, Innovative Software Inc.). The results of the analysis are presented in chapter 6. Information on acceptability from questionnaire responses is presented in chapter 7.

Chapter 6:
Results of the randomised controlled trial

Introduction

The study compared two *health care packages*. The possibility of some hospital clinic care of prompted patients and GP care of control patients was integral to the randomised groupings. Despite the prompted care group having been discharged from the hospital diabetic clinic to be subsequently prompted for GP and optometry care, prompted patients could also be referred to hospital diabetic outpatients. Similarly, patients in the hospital clinic control group could consult their GP for a diabetes-related reason.

TABLE 3: Baseline comparisons at the outset of the study

	Control group		n_c	Prompted Group		n_p	p
Mean age (years)	63.1	(8.6)	92	62.0	(11.2)	89	NS
Mean duration of diabetes mellitus (years)	7.1	(4.9)	91	6.9	(5.0)	89	NS
Mean interval between last diabetic clinic attendance and randomisation (years)	0.6	(0-2.0)	92	0.6	(0-1.8)	89	NS
Number of male patients	51	(55%)	92	54	(61%)	89	NS
Number of patients controlled on diet alone	26	(28%)	92	23	(26%)	89	NS
Number of patients controlled on diet plus oral hypoglycaemics	62	(67%)	92	65	(73%)	89	NS
Mean weight (Kg)	75.2	(12.9)	83	76.1	(14.5)	85	NS
Mean random plasma glucose (mmol/L)	9.9	(4.1)	90	9.6	(3.8)	88	NS
Mean glylcated haemoglobin HbA_1 (%)	10.3	(2.3)	41	10.4	(2.5)	28	NS
Mean systolic blood pressure (mmHg)	153.6	(24.2)	86	144.5	(22.0)	86	0.011
Mean diastolic blood pressure (mmHg)	84.3	(10.9)	86	83.3	(11.5)	86	NS
Number of patients without diabetic complications	33	(36%)	92	39	(45%)	86	NS
Number of patients with ischaemic heart disease	18	(20%)	92	17	(20%)	86	NS
Number of patients with neuropathy	25	(27%)	92	20	(23%)	86	NS
Number of patients with leg ischaemia	4	(4%)	92	14	(16%)	86	0.017
Mean number of complications per patient	1.3	(1.2)	92	1.1	(1.3)	86	NS

Values listed are the most recent for each group prior to randomisation and are given as mean (SD) for normally distributed data and median (range) for skewed data.
n_c = number in control group; n_p = number in prompted group; NS = not significant at the 5% level.
Statistical tests used: 2 tailed t-test for continuous variables; χ^2 test for proportions (with continuity correction)

Patients who dropped out of their randomised group, for whatever reason, are treated in the evaluation as members of the group to which they were initially randomly allotted. The results of the evaluation are based, therefore, upon an intention to treat analysis.

Baseline comparisons

Comparisons of control and prompted patient groups at the start of the study are shown in Table 3. Information on variables such as weight, BP and glycated haemoglobin was not available for 100% of each patient group. The most recent outpatient attendances were on average 6 months prior to the dates of randomisation, consistent with the hospital clinic policy of 6 monthly review of diabetes in most cases. The two study groups were well matched for demographic variables and also for most important diabetic attributes, except for two factors: mean systolic BP was 9mmHg greater in the control than in the prompted group (95% confidence interval 2.1 to 15.9; p=0.011), and 14 patients in the prompted group were recorded as having evidence of leg ischaemia compared with only 4 patients in the control group (χ^2 =5.7, 1DF; p=0.017).

Process of care

Table 4 shows the prompting system process measures. During the period of the study, 333 prompts for patients to obtain appropriate blood and urine tests generated 296 sets of results, an 89% completion rate. Of the consequent 296 prompts requesting GP clinical review 275 were completed representing 93% compliance with the GP prompt: an 83% ($^{275}/_{333}$) completion rate of blood test and GP review. 145 prompts for eye tests by optometrists showed an 86% completion rate.

Table 5 shows process of diabetic care measures in the two patient groups. For each patient in the study, the duration of involvement was equal to the interval between date of randomisation and 31st October 1990, or the date of death or departure from the area if earlier. By the end of the study the mean duration of follow-up for the two groups was slightly different (2 years in controls, 1.7

years in the prompted group; p=0.005) as a result of some of the prompted patients leaving the locality before the end of the study.

TABLE 4: Prompting system process measures

	Prompts issued	Prompted action completed	Compliance rate
Blood + urine tests (n_p = 89)	333	296	89%
GP Clinical review (n_p = 89)	296	275	93%
Eye review *(n_p = 74)	145	125	86%

Note: n_p = number in prompted group
*For prompted eye reviews n_p = 74 because 15 patients attended a hospital eye clinic from the start of the study

TABLE 5: Process of care measures

	Control		Prompted		P
n_c = 92 n_p = 89 Number of patients without doctor diabetes review	14	(15.2%)	3	(3.4%)	0.013
n_c = 78 n_p = 86 Mean duration of study (years) - for patients with ≥1 reviews	2.0	(0.6)	1.7	(0.7)	0.005
Mean number doctor diabetes reviews per patient/year	2.4	(1.3)	3.0	(3.8)	0.07
Mean number diabetes reviews per patient per doctor	2.2	(2.0)	3.2	(1.9)	<0.001
Mean number of urine tests for albumin per patient/year	2.3	(1.4)	3.0	(4.5)	0.03
Mean number plasma glucose estimations per patient/year	2.3	(1.4)	3.1	(4.5)	0.003
Mean number of HbA_1 estimations per patient/year	0.9	(0.9)	2.4	(3.8)	<0.001
Mean number of weight assessments per patient/year	2.3	(1.4)	3.1	(4.5)	0.008
Mean number of blood pressure assessments per patient/year	1.5	(1.2)	2.6	(3.7)	<0.001
Mean number of foot examinations per patient/year	1.1	(0.8)	1.6	(2.3)	0.003
Number of patients referred to dietitian (%)	32	(41%)	29	(34%)	NS
Number of patients referred to chiropodist (%)	10	(14%)	7	(8%)	NS
n_c = 85 n_p = 85 *All reason consultations with GP per patient per year	6	(0-36)	8	(0-104)x	NS
+Diabetes related consultations with GP per patient per year	2	(0-24)	3	(0-104)x	NS

Note: All values are given as mean (SD) for normally distributed data and median (range) for skewed data.
n_c = number in control group; n_p = number in prompted group; NS = not significant at the 5% level.
Statistical tests used: two tailed t-test for duration, Mann-Whitney test for rates (adjusted for ties)
χ^2 test for proportions (with continuity correction)
* All process measures include only patients who were reviewed at least during the study period.
+ Excludes prompted GP patient contacts
x Wide range results from 1 prompted patient leaving the locality 1 week after randomisation, having already consulted their GP for a diabetes related reason on 2 occasions

Fourteen (15.2%) patients in the control group failed to be seen again in a hospital diabetes clinic during the period of the study. This compares with only 3 (3.4%) of the prompted patients who failed to attend for clinical diabetic review (p=0.013).

In those patients who did not default from follow-up, there was no strong evidence of a difference in the doctor diabetes review rate in the two groups (c: 2.4 v. p: 3; p<0.07), but the prompted group received greater continuity of care from doctors: the number of structured diabetic reviews per patient performed by the same doctor was significantly greater than in the hospital clinic group during the study period (c: 2.2 v. p: 3.2 p<0.001). Urine tests to detect albuminuria, and blood tests for random plasma glucose and HbA_1 estimations were also performed more frequently in the prompted group. All the clinical process of care measures were carried out significantly more frequently in the prompted group: mean number of weighings, blood pressure assessments and frequency of foot examinations. There was no difference in the number of patients referred for dietary advice or chiropody.

At the end of the study period 94% of the GP notes for both control and prompted patients were traced. Consultations with GPs were classified as diabetes-related if the doctors' notes made any reference to a diabetic measurement, complication, diet or diabetic medication. Excluding *prompted* consultations for diabetic review, GP notes revealed a high annual consultation rate for both groups, 8 in prompted group versus 6 in controls but with no statistically significant difference between the two groups. Diabetes-related consultation rate *not* resulting from prompting also showed no significant difference between the two groups (3 per patient per year in the control group compared with 2 per patient per year in the prompted group).

Table 6 shows the number of patients in the prompted group who were seen in a hospital diabetic clinic during the study. A total of 52 (58%) patients in the prompted group were reviewed in hospital outpatients after randomisation. 28 patients were referred by their GP using the referral arrangements provided by the system. These

patients received 66 hospital doctor reviews. Three patients were referred by the database on account of high random plasma glucose levels and were reviewed on 5 occasions. The prompted group received in all 139 doctor reviews in hospital outpatients which amounted to 33.5% ($^{139}/_{414}$ [275 prompted GP reviews + 139 hospital clinic reviews]) of the total number of doctor reviews received by this group during the study period.

TABLE 6: Referral and number of attendances at Hospital Diabetic Clinics (HDC) in prompted group patients

	Number of patients reviewed in HDC	Number of diabetes reviews in HDC
GP referrals	28	66
Database referrals	3	5
Extraneous referrals	21	68
Total	52	139

The routes of referral to hospital clinics for prompted patients could not always be traced. 21 patients were referred in a manner extraneous to the scheme, receiving 68 doctor diabetes reviews in hospital. Of these, five were patients who changed their minds about accepting prompted care soon after receiving their first prompt and who subsequently received all their care in hospital outpatients, but who nevertheless remain in the prompted group for evaluation purposes. Some patients were referred to hospital clinics following inpatient episodes, or from other outpatient clinics. A few patients may have referred themselves. If, for the purposes of comparing process of care between control and prompted patients, all these 21 patients were to be excluded from the evaluation, the significance of the findings evidenced in Table 5 remain unchanged at the 5% level. In other words, the better process of care measures in the prompted group as a whole are not merely the result of hospital clinic attendances on the part of the 21 patients who were referred back to hospital outpatients by a route extraneous to the prompting arrangements.

The total number of structured clinical assessments of diabetes per

patient in each group by location of care is shown in Table 7. This table does not include unprompted diabetes-related consultations with GPs because these did not constitute *structured* review within the framework of the initiative and evaluation.

TABLE 7: Average number of structured clinical reviews of diabetes per patient by location during the study period

Location of review	Control Group (n_c = 78)	Prompted group (n_p = 86)	p
Hospital diabetic clinic	4.2 (2.7)	1.6 (2.2)	<0.0001
General practice	0	3.2 (1.7)	<0.0001
Total	4.2 (2.7) 100% in hospital	4.8 (2.2) 67% in general practice	NS

Note: All values given as mean (SD)

The table shows the shift in the location of care achieved by the prompting system. The total structured review rate did not differ significantly during the study period (c: 4.2 v. p: 4.8). In the control group, 100% of structured diabetic reviews occurred in hospital outpatients, whereas two thirds of the structured care in the prompted group occurred in general practice. Table 7 also shows the relative contribution of the hospital clinic to the process of care in the prompted group. The mean hospital diabetic review rate per patient was 4.2 v. 1.6 in control and prompted patients respectively. The controls received no structured diabetic care in general practice whereas the prompted group received a mean rate of 3.2 structured diabetic reviews per patient in general practice during the study period. This difference can be understood in two ways. On the one hand, it is a measure of the degree to which the hospital diabetic clinic was called upon to provide structured diabetic care for the prompted patients. On the other hand, it indicates the extent to which a prompted community care approach can relieve a hospital diabetic clinic of two thirds of the work associated with the care of appropriately selected patients.

Medical outcome

Tables 8 and 9 each show variables of medical outcome. The measures reported in Table 8 are not subject to observer variability. By the

end of the study there was no significant difference in the mean random plasma glucose in the two groups, although the mean levels had both risen from their baseline values by 1.3 mmol/L and 1.6 mmol/L in control and prompted groups respectively. (These within-group differences reached statistical significance in both instances $p < 0.05$). However, the possibility that a degree of glycaemic control had been lost in both groups was not supported by the HbA_1 results: mean last recorded glycated haemoglobin showed no significant difference between group (c: 10.6 v. p: 10.3), with a small non significant *rise* from baseline in the control group from 10.3 to 10.6, and a non significant *fall* from baseline in the prompted group from 10.4 to 10.3. An additional measure of glycaemic control is provided by looking at the mean of all the HbA_1 results for each patient since randomisation and then calculating the mean of means for each group. This also shows no significant difference between control and prompted patients (c: 10.6 v. p: 10.0, 95% confidence limits for the true difference = 1.27 to -0.07 164df; $p = 0.064$).

TABLE 8: Medical outcome 1 - objective measures

	Control		Prompted		p
Mean random plasma glucose (mmol/L) $n_c = 77$ $n_p = 82$	11.2	(4.2)	11.2	(4.2)	NS
Mean glycated haemoglobin HbA_1 (%) $n_c = 81$ $n_p = 85$	10.6	(2.5)	10.3	(2.3)	NS
*Mean of each patient's mean HbA_1 since randomisation (%) $n_c = 81$ $n_p = 85$	10.6	(2.4)	10.0	(2.0)	0.06
Total number of treatment category changes start to finish	13		14		NS
Diet → Oral hypoglycaemics $n_c = 23$ $n_p = 23$ on diet at entry	8	(35%)	10	(43%)	NS
Diet → Insulin $n_c = 23$ $n_p = 23$ on diet at entry	1	(4%)	2	(9%)	NS
Oral hypoglycaemics → Insulin $n_c = 55$ $n_p = 63$ on oral hypoglycaemics at entry	4	(7%)	2	(3%)	NS
Number of patients who received hospital inpatient treatment $n_c = 92$ $n_p = 89$					
Diabetes related	17	(18%)	8	(9%)	NS
Non-diabetes related	10	(11%)	7	(8%)	NS
Number of deaths $n_c = 92$ $n_p = 87$	7	(8%)	7	(8%)	NS

Note: All values listed are taken from assessments nearest to the end of the study and unless otherwise stated are given as mean (SD) for normally distributed data and median (range) for skewed data.
n_c = number in control group; n_p = number in prompted group; NS = not significant at 5% level
Statistical tests used: two tailed t-test for duration, Mann-Whitney test for rates (adjusted for ties)
χ^2 test for proportions (with continuity correction)
* Based upon 202 observations in control group, 296 observations in prompted group.

Changes in diabetes treatment categories (eg: diet to hypoglycaemics or insulin) were quantified by comparing treatment at the start and at the end of the trial. There was no statistical difference between the two groups in these treatment changes. The total number of patients admitted to hospital and the number with a diabetes related reason for admission were not significantly different. The number of deaths during the study period was the same in each group.

Table 9 reports measures of clinical outcome which are subject to observer variability. Of the recorded clinical outcomes, systolic blood pressure remained 9 mmHg higher in the control group, as it had been at the start of the study. The number of patients with signs of lower limb ischaemia recorded in their notes was greater in the prompted group than control group (c: 8 v. p: 28; p=0.001). During the study period, therefore, 4 controls and 14 prompted patients were recorded as having developed lower limb ischaemia. It should be noted, however, that the two groups were not matched at baseline for this complication which in both groups was diagnosed solely on the basis of a finding, by hospital doctor or GP, that two or more foot pulses were impalpable.

TABLE 9: Medical outcome 2 - values subject to observer variability

		Control	Prompted	p
Mean weight (Kg)	n_c = 75 n_p = 81	74.7 (14.5)	75 (14.6)	NS
Mean systolic blood pressure (mmHg)	n_c = 73 n_p = 82	153.6 (25.9)	144.9 (23.2)	0.03
Mean diastolic blood pressure (mmHg)	n_c = 73 n_p = 82	86.5 (11.4)	81.4 (10.2)	0.004
Number of patients without any diabetic complication	n_c = 78 n_p = 86	13 (17%)	9 (10%)	NS
Number of patients with ischaemic heart disease	n_c = 78 n_p = 86	22 (28%)	21 (24%)	NS
Number of patients with neuropathy	n_c = 78 n_p = 86	34 (44%)	33 (38%)	NS
Number of patients with leg ischaemia	n_c = 78 n_p = 86	8 (10%)	28 (33%)	0.001
Number of patients with albuminuria ≥ + during study	n_c = 78 n_p = 86	19 (24%)	15 (17%)	NS
Number of patients developing stroke during study	n_c = 78 n_p = 86	4 (5%)	1 (1%)	NS
Mean number of complications per patient	n_c = 78 n_p = 86	1.9 (0-6)	2.1 (0-7)	NS

Note: All values listed are taken from assessments nearest to the end of the study and unless otherwise stated are given as mean (SD) for normally distributed data and median (range) for skewed data. n_c = number in control group; n_p = number in prompted group; NS = not significant at 5% level. Statistical tests used: two tailed t-test for duration, Mann-Whitney test for rates (adjusted for ties) χ^2 test for proportions (with continuity correction)

The following additional measures of clinical outcome showed no difference between the two groups: the number of patients without any recorded diabetic complication, the number of patients with recorded neuropathy, ischaemic heart disease, one or more recordings of albuminuria of ≥ + during the study, or the number of patients with onset of stroke during the study.

Eyes

Table 10 shows baseline, process of care and outcome measures for eyes in the two groups. At the start of the study, 70 patients in the control group and 74 in the prompted group were not currently attending a hospital eye clinic. At baseline, there was no significant difference in the proportion of patients in each group with recorded evidence of cataract or previous cataract extraction, or of diabetic retinopathy.

TABLE 10: Eyes - comparisons at baseline and at the end of the study
(excluding patients who were attending hospital eye clinics at the outset of study)

		Control	Prompted	p
At baseline: Number of patients	$n_c = 70$ $n_p = 74$			
Number of patients with cataract/extraction		7 (10%)	4 (5%)	NS
Number of patients with non STR		1 (1%)	2 (3%)	NS
Process of care	$n_c = 70$ $n_p = 74$			
Number of patients who did not attend		12 (17%)	2 (3%)	0.008
Mean number of eye examinations per patient per year	$n_c = 58$ $n_p = 72$	0.9 (0.8)	1.1 (0.8)	NS
Number of patients referred to hospital eye clinic		11 (19%)	7 (10%)	NS
Outcome	$n_c = 58$ $n_p = 72$			
Number of patients with new cataract		3 (5%)	29 (40%)	<0.001
Number of patients developing non STR		2 (4%)	2 (3%)	NS
Number of patients with new STR		5 (9%)	2 (3%)	NS

Note: STR = sight threatening retinopathy.
All values listed, other than baseline are taken from assessments nearest to the end of the study and unless otherwise stated are given as mean (SD).
n_c = number in control group; n_p = number in prompted group; NS = not significant at 5% level.
Statistical tests used: two tailed t-test for duration, Mann-Whitney test for rates (adjusted for ties)
χ^2 test for proportions (with continuity correction)

During the study period, 12 controls and 2 prompted patients did not attend either hospital outpatients or optometry screening (p=0.008). After randomisation, the prompted group received on average 1.1 eye examinations per year compared with 0.9 in the control group. There

was no significant difference between the two groups in the number of patients referred to hospital eye clinics. The number of cataracts newly recorded by optometrists in the prompted group vastly exceeded that recorded by doctors in the hospital clinic group (c: 3 v. p: 29; $p<0.001$), though the study incidence of newly recorded retinopathy did not differ significantly between the two groups.

Discussion

These results show that a prompting system of structured diabetic care can support appropriate medical care comparable to that provided in a hospital diabetic clinic in the case of non insulin treated patients registered with small inner city general practices in inner London. Prompted care in Islington resulted in a significantly lower lost to follow-up rate than that achieved in the hospital diabetic clinic.

Professional and patient compliance proved high; the lower default rate in the prompted group is especially important because loss to follow-up carries an increased risk of the onset of diabetic complications, particularly in non insulin treated patients (Hammersley et al 1985).

Prompted care achieved six monthly doctor review together with high levels of specific diabetes assessments with more frequent recordings of weight, blood pressure and foot inspection in the prompted group than in controls. All prompted GP reviews were performed in the context of results from recent blood glucose, HbA_1 and albuminuria estimations. This level of assessment compares favourably with the most comprehensive levels of care reported from hospital clinics, or from GP mini-clinic care (Porter 1979, Yudkin et al 1980, Williams et al 1989, Kemple 1991, Parnell 1993). The system clearly allowed for easy referral of patients to the hospital clinic if deemed necessary by the GP. However, it is important to note that 40% ($^{21}/_{52}$ see Table 6) of prompted patients who were reviewed in a hospital diabetic clinic at some point during the study found their way there without GP referral, though a quarter of

these were patients who changed their minds about accepting prompted care.

Differences in the knowledge and skills of health carers in their very different settings are likely to result in differences in quality of care. While it is recognised that process of care measures are an imperfect surrogate for the standard of patient care, objective measures of medical outcome showed no strong evidence of poorer care in one group than another. There was no evidence, for example, of deterioration in glycaemic control between the two groups, and rates of admission to hospital and mortality were both comparable.

Some of the clinical outcome measures consisted of records of observations performed in routine care settings on the part of a wide variety of doctors not trained to minimise inter- and intra-observer variability. Though the proportion of patients recorded as showing new onset of lower limb ischaemia was greater in the prompted group, this could be a result of poor GP skills in detecting foot pulses. On the other hand, this result may not have been due to poor examination skills but could have been the result of a higher level of lower limb ischaemia at baseline documented in the prompted group shown in Table 3 (Osmundson et al 1990). Similarly, the rise in mean diastolic blood pressure in the hospital controls, together with a small fall in the prompted group at the end of the study are of questionable significance in view of the likely observer error in these measurements.

The responsibility for retinal screening lay with optometrists in the case of patients not already under the care of a hospital eye clinic at entry to the study. After allowing for a higher non attendance rate in hospital controls, the process of care was comparable in the two groups. Whilst acknowledging there to be no 'gold standard' here, there was also no difference between the two groups in the onset of retinopathy during the study. The much higher detection rate of cataract in the prompted group probably reflects the diligence of optometrists in noting these defects compared to

less rigorous criteria used by hospital clinic doctors.

The next chapter looks at the acceptability of this system of care to patients, GPs and optometrists by examining their replies to questionnaires.

Chapter 7:
Acceptability of prompted diabetic care

INTRODUCTION

The previous chapter revealed high process of diabetic care levels in the prompted group as a result of a high degree of compliance with the prompting regime. More detailed responses were sought, by questionnaire, from each of the three participating groups (see Appendices 11, 12 and 13).

Patient questionnaire

For the prompted group, diabetic care was no longer routinely available as it previously had been at the hospital clinic, where the relevant services, (including laboratory investigations, doctor review, retinal screening, dietary advice and chiropody) were all available under one roof in a single package. In place of this 'one stop' diabetic care package, prompted care offered devolved 'several stop' care provided within a network. It was apparent that the smooth running of this network of care could be vulnerable to break down at a number of different points. It was therefore important to gauge the network's operation and form a view about its acceptability to patients early on in the study, in case a significant defect or oversight in the design and working of the prompting system needed adjustment or correction.

In May 1989, 12 months after prompting began, a detailed questionnaire comprising 50 question stems was sent to all those patients (n=42) who had, by that stage, received 5 separate community care prompts. It was sent, therefore, to all those patients who should have completed, by that stage, an entire cycle of prompting had they been fully compliant (see Figure 2). The covering letter which accompanied the questionnaire stressed the absolute confidentiality and of the replies.

Thirty-nine patients (93%) returned the questionnaire completed and their responses are documented in Appendix 11. The questionnaire was divided into sections representing the key elements involved in an

entire prompting cycle. Section 1 (questions 1-10) sought views on the acceptability of arrangements provided by the prompting system for obtaining blood and urine tests. As can be seen from the responses, despite the availability of phlebotomy services at local health centres, 72% of prompted patients preferred to attend their previous hospital laboratory instead (i.e: Royal Northern or Whittington Hospital). Phlebotomy services proved accessible to patients; they were judged to be less than a mile from home by 57%, and took less than 30 minutes for patients to reach for 72% of respondents. In 1989, there was no cost incurred for a return journey for phlebotomy for 70% of patients, and most had to wait less than 30 minutes after arrival before they were attended to. Overall, 95% of prompted patients surveyed felt that these arrangements for blood and urine tests were acceptable.

Section 2 of the questionnaire (questions 11-22) sought views on the test results and prompted clinical review forms sent to patients to take to their general practitioner. Although 64% said they read their diabetic record and test results, only 21% of patients claimed to understand most of what was on the record. Ten percent stated that they thought the record was incomplete but did not indicate what sort of information they felt was missing. Only 8% confessed to being upset or worried by something they had read on their diabetic record; in the case of three patients this was the result of concern they felt about high plasma glucose or weight gain. No one felt that the records which they received were factually wrong, or contained inappropriate information. Half the respondents felt that it would be helpful if they could keep a copy of their diabetic record, and three commented that they would like some of the records' terms explained.

Section 3 (questions 23-29) requested information on patients' perceptions of the role of the general practitioner in prompted care. Almost 60% of patients said they made an appointment to see their GP on receipt of the test results, rather than turning up for a diabetic review in a non appointment surgery. 62% aimed to see a particular doctor for a diabetes review rather than whoever happened

to be available in the practice. 72% of patients remembered the GP discussing their blood sugar tests with them when they consulted, and 56% felt that their GP applied the same standard of blood sugar control that had been applied previously by the hospital diabetic clinic. Over half of patients felt that the GP had performed a thorough assessment of their diabetes though 8% classed the GP assessment as poor. Overall, 90% believed that they could trust their GP to monitor their diabetes as well as, or better than, the hospital diabetic clinic. Of the 4 patients who made comments about their GPs (in response to question 29), one felt that time spent with the GP was too short, another complained that the GP only asked about urine tests, one felt that GP explanations were inadequate, and another professed trust in their GP in virtue of the fact that the GP was a diabetic too!

Section 4 of the questionnaire (questions 30-40) enquired about the arrangements for retinal screening in the prompted group. Ten of the 39 patients who returned the questionnaire attended a hospital eye clinic at the start of the study and were consequently not prompted for regular eye tests by an optometrist. Of the 29 patients who returned the questionnaire who had received an eye test prompt, 65% stated that they had attended a participating optometrist within a mile of home. Travel to the optometrist was estimated to take less than 30 minutes in the case of over half the patients. The return journey had been made free of charge for 80% of the patients. The vast majority of patients (83%) remembered receiving mydriatic eye drops when they attended for retinal screening, though 52% had no memory of any warning concerning subsequent glare from bright light. Only 28% could remember being told what to do if they felt the onset of pain in their eyes within 24 hours of receiving mydriatic drops. Overall, 79% of responding patients felt that the eye examination by an optometrist was as good as, or better than, the eye checks previously received in the hospital diabetic clinic. 97% of patients found these arrangements for retinal screening acceptable.

Section 5 of the questionnaire (41-46) was designed to bring to light any difficulties patients may have experienced in the event of

being referred for services such as dietary advice, or chiropody. Very few of the patients surveyed had been referred, by this time, for these services. This meant that only a couple of patients responded to the questions in this section. No problems had been encountered by these patients over referral to dietetics or chiropody.

Section 6 (questions 46-50) was designed to gauge an overall patient view on the operation of prompted care in comparison to previous hospital clinic care. To question 46, 77% of patients felt that prompted care was as good as hospital clinic care, 5% felt it was better and 10% judged it to be worse. In response to question 47, which sought views on the *best* aspects of prompted care, 3 patients found it had been easier to contact their GP for advice than the hospital clinic, 7 mentioned nearness of the GP's surgery to home as an advantage, and 7 mentioned that the short wait to see their GP as positive features. Two patients mentioned that continuity of care by the GP was better than by the hospital clinic. Comments in response to question 48 which elicited views on the *worst* aspect of prompted care included unhappiness at feeling that the GP was 'too rushed', and another that 'one check-up involves several journeys'. Two patients stated that, in their view, there was nothing bad about GP care. These responses need to be contrasted with memories of the *best* aspects of hospital clinics revealed in replies to question 49 which included 'one visit to do everything' (5 patients), 'staff at the hospital have more time', and 5 patients who felt that more explanation and more expertise had been available in hospital. One patient wrote that 'I only changed because of a two year experiment'. Another stated that 'I felt special when attending the hospital clinic' with the implication that this 'specialness' had disappeared once transferred to prompted care. On the other hand, memories of the *worst* aspects of the hospital clinic included the following: 3 patients who found that the hospital was too far away, 18 who mentioned poor time-keeping in the clinic with long waiting times, and four patients who stated that there was 'nothing wrong with the hospital clinic'.

Discussion of patients' questionnaire results

Validated patient questionnaires have been used as an outcome tool to gauge various aspects of diabetic patients' understanding of their condition, satisfaction with care and perceived sense of control of their condition (Harvey et al 1992). The questionnaire discussed here aimed to gauge patients' reactions to prompted care under a number of headings rather than in depth knowledge of their beliefs and attitudes (Kinmonth et al 1989, Murphy et al 1992).

The high patient response rate together with the fact that almost all patients succeeded in completing the 50 questions suggest that the questionnaire was both easily comprehensible and was perceived to pose relevant questions by the vast majority of patients. Their responses clearly indicate considerable, though not unqualified, satisfaction with the prompting system. Importantly for the continuation of the pilot study, the questionnaire failed to reveal any area in the design or operation of the prompting system which was in need of alteration at that comparatively early stage in the pilot study.

Although the questionnaire had not been independently validated, the responses revealed that prompting structured diabetic care in the manner described was found to be an acceptable approach by most patients who responded. The potential inconvenience of 'several stop' care, compared to 'one stop' hospital clinic care did not seem to be perceived as a major drawback and did not, in most cases, incur additional expenses. Retinal screening by optometrists was popular in the subgroup of patients not already under the care of a hospital eye clinic.

It is possible to detect a degree of anxiety in patients' responses when asked, in effect, to 'choose' between prompted care and hospital clinic care. As a result, many patients expressed approximately equal satisfaction and loyalty to both approaches to diabetic care. This may be a reflection of a perceived split in loyalties which the questionnaire may have appeared to patients to have demanded concerning preference for 'GP v hospital' care. Thus

many patients who may have been aware of the various strengths and weaknesses of these different approaches to providing care, did not seem to accept that they could be mutually exclusive alternatives. Some patients expressed concern about being separated from the greater in-depth knowledge and expertise concentrated in the hospital diabetic clinic. Although some appear to have wanted to continue with prompted care, others seemed content with this prospect only on condition that occasional review in the hospital clinic was not excluded.

In conclusion, the questionnaire revealed that prompted patients had a good grasp of the important issues involved in devolving the care of diabetes into the community. Prompted care in the manner described was broadly acceptable to this group of patients who, it should be borne in mind, were mostly seasoned hospital clinic attenders prior to the start of the study. However, their acceptance of a prompted approach broadly appeared conditional upon referral back to the hospital always remaining an option.

GP questionnaire

In June 1990 a questionnaire was sent to those doctors (n=48), principals, trainees or assistants of participating practices who had performed two or more prompted clinical reviews since the start of the project. The questionnaire comprised 24 question stems which 31 doctors (65%) completed as documented in Appendix 12. A selection of their responses to 7 questions are shown in figure 9. In response to question 1, the doctors scored this method of organising the care of Type II diabetes 4.3, on average, upon a scale 'very poor' = 1 to 'excellent' = 5. Their confidence in providing care within this framework averaged 4 on the same scale (question 2), 97% indicating that this method of care interfaced well with their practice (question 3).

In response to question 4 which enquired into their views about the value of the prompted diabetic review form (Figure 9) they scored this 4.3 on average upon a scale 'useless' = 1 to 'useful' = 5. Their views scored 3 on the same scale in response to a question

about whether the diabetic review form was too simple or too complex and in response to whether the record provided too little or too much space to write upon.

Suggestions made in response to question 5 concerning how to improve the prompted diabetic record form were few, but included addition of lipid levels to the biochemistry section, and provision to enable GPs to refer the patient to an ophthalmologist by means of the feedback form. 90% of respondents expressed satisfaction with the referral arrangements provided by the prompting system (question 6). We were interested to know where, within the patients' notes, the doctors filed their copy of the diabetic record; 77% of GPs filed it in the letters' section of the notes and 16% in the laboratory results section.

In reply to question 8 about whether prompting should be organised at fixed intervals or not, 59% of GPs expressed satisfaction with the current arrangements of 6 monthly prompts at fixed intervals, but 21% stated they would prefer the prompting interval to be triggered by a GP decision. Comments on this question ranged from requests for less frequent to more frequent prompting, and included several comments requesting greater frequency of prompts in the event of poor glycaemic control.

Replies to question 10 revealed that GPs estimated that, on average, a regular review assessment of a diabetic patient in the prompted care scheme took them 9.8 minutes compared to 13.4 minutes for an annual diabetic review. Though 77% of participating GPs ran an appointments system, less than three quarters replied to the follow-on questions concerning the proportion of their surgery hours which were by appointment only. However, the majority of those who did respond to this question said that 75% of their surgery time was by appointment only. This has a bearing, no doubt, upon why the GPs did not experience any appreciable disruption to their surgery in the performance of prompted diabetic reviews (question 11): 90% of the doctors who responded wished to continue participating in the prompting system and 76% of GPs were prepared to see more patients,

including insulin treated diabetics, if they could be cared for within this prompted care framework (question 12).

Figure 9: Selection of responses to GP questionnaire.

n = 31

Q1. Is the prompting system a satisfactory method of organisation for supporting the clinical care of type 2 diabetic patients in your practice?

	Very poor				Excellent	Mean Score
Scale	1	2	3	4	5	4.3
Response %		10	7	32	52	

Q2. How confident do you feel about providing clinical care to these patients using this system?

	Not at all confident				Very confident	Mean Score
Scale	1	2	3	4	5	4.0
Response %	3		7	48	55	

Q4. Are the clinical review forms in use:

	Useless?				Useful?	Mean Score
Scale	1	2	3	4	5	4.0
	Too simple?				Too complex?	
	1	2	3	4	5	2.9
	Provide too little space?			Provide too much space?		
	1	2	3	4	5	2.9

Q9. How long does it take to complete:

	Mean
An Annual Review assessment?	13.4 mins
A Regular Review assessment?	9.8 mins
(1 Unanswered)	

Q11. Does seeing a diabetic patient for clinical review disrupt your surgery to any appreciable extent?

	A great deal				Not at all	Mean Score
Scale	1	2	3	4	5	4.3
Response %	0	10	23	29	39	

Q16. In the current system, who do you feel takes clinical responsibility for these prompted patients?

GP	Hospital	Both	Don't know
26%	10%	55%	10%

Q17. Would you be prepared to have more patients attending your surgery for their diabetic care within this framework?

Yes	No	Undecided
76%	4%	20%

Replies to question 13 indicated that over 50% of GPs felt that even if extra payments were made available to doctors providing this form of diabetic care their answers to question 12 would not vary, though 16% said that if payments *were* to be made for prompted review this would act as an incentive to review more patients within these arrangements.

Questions 14 to 16 sought to elicit GPs' understanding of what happened to the copies of the clinical review forms once returned to the database. Over half thought the review forms were checked for clinical content by a research fellow/registrar (whereas they were, in fact, checked by the non clinical coordinator of the study for full completion who only referred to a doctor (the author) if the review forms appeared to contain worrying data). 90% of GPs responding believed that a doctor from the hospital diabetic unit might make contact with them about a particular patient as a result of returning the review form copy. There was little consensus as to who had clinical responsibility for prompted patients; 55% of GPs believed it to be both GP and hospital, 26% GP only, 10% hospital only, with 10% of GPs stating that they did not know who carried this responsibility. By and large, most GPs felt that their clinical review forms should be checked, in future, by a registrar/research fellow (76%), consultant (24%), diabetes specialist nurse (38%).

In response to question 18 which asked about the adequacy of the feedback from retinal screening by optometrists, GPs scored this, on average, 4.3 on a scale 'useless' = 1 to 'useful' = 5. Forty-eight percent of doctors accepted that a random plasma glucose of $\geq$ 25mmol/L should act as a threshold triggering referral by the prompting system straight to the hospital diabetic clinic instead of to the general practitioner (question 19), though 39% felt that the level of this threshold glucose was set too high. Only two GPs said they would prefer to be consulted before any such referral to the hospital clinic was made by the prompting system. Question 20 was aimed at sampling GP views as to which other clinical or biochemical abnormalities should be used as thresholds for immediate referral to the hospital clinic by the prompting system. Unfortunately,

responses to this question indicated that it had been poorly phrased as a high proportion of GPs interpreted it to be asking them to list the sorts of diabetic complications which would lead them (rather than the prompting system) to refer patients to hospital.

Of those who replied to question 21 enquiring about whether information supplied prior to the start of the study had been adequate, 21 GPs felt that it had been adequate, whereas 3 felt it had been inadequate. Fourteen doctors found the backup support during the study to have been adequate but 7 had been unaware of any. In July 1990, answers to question 22 were supplied by only 26 of the GPs; 60% of them said they were planning to set up a diabetic clinic with the help of (an average) 6.6 nurse sessions per week in the practice. In response to the possibility of practices being given computer software to run a diabetic prompting scheme similar to the one piloted here from the GPs' own practice, 42% stated they would welcome such a development, whereas 58% rejected it. Some of those against such an idea mentioned not having a computer as one of the reasons; others felt the hospital was a more appropriate place from which to run a recall system of this type. Responses to question 24 which asked how the hospital diabetic unit could better support community diabetic care included the following:

-more diabetes education sessions	x 4
-more contact with diabetes specialist nurse	x 2
-visits to practices by registrar/consultant	x 1
-access to telephone advice (already provided)	x 2
-more opportunities for practice nurse training	x 2
-the creation of a diabetes-walk in clinic locally	x 1

<u>Discussion of GP questionnaire</u>

The results of this questionnaire need to be interpreted in the light of the lower response rate than was found to the patient questionnaire. Replies show that GPs found it easy to incorporate the demands made by prompted review of Type II diabetes into their normal day-to-day work. This may reflect the small numbers of clinical reviews (range 2-16) that many of the GPs had performed - 50% of respondents had performed 5 or less reviews since the start of the study. Nevertheless, they expressed confidence in the overall

framework of prompted care and their role within it. The design of the clinical review forms was felt to be appropriate, and time taken to perform regular and annual clinical assessments was not found to be unduly long. There was general, but not unanimous, agreement with the operation of fixed prompting intervals which could also be varied by GP request. About a fifth of GPs wanted prompting to be entirely triggered by a GP decision.

The questionnaire revealed a certain amount of disagreement about who was thought to have clinical responsibility for the prompted patients. As already stated, 55% of GPs felt that this responsibility was shared between themselves and the hospital, whereas a quarter held that GPs alone had clinical responsibility, 10% felt it belonged to the hospital alone, and 10% did not know where it lay. This is an important area of potential confusion and was further reflected in the GP belief that the clinical review forms, returned to the database, were all checked for clinical content by a research fellow or registrar.

There are a number of tenable positions in response to this question. On the one hand prompted patients had all been hospital diabetic clinic attenders until the start of the trial. Once the trial began, the hospital, having assumed responsibility for the basic architecture of the care to be offered was also responsible, it could be argued, for the organisation of the care even though its employees were not the ones who, in the absence of referral, actually delivered clinical care to prompted patients. On the other hand, since GPs and optometrists were the clinicians who provided the face-to-face clinical care to patients, it could be argued that they bore full clinical responsibility for prompted patients. In reality, the clinical review forms had not been checked for clinical content by a registrar or research fellow. Instead, the forms were scanned so that any patient with a random plasma glucose between 20-24.9 mmol/L was sent an urgent GP assessment prompt, and if ≥ 25mmol/L the patient was referred straight to the hospital diabetic clinic in place of their general practitioner (see protocol of prompted care Appendix 6). However, since these possibilities were actually built

into the structure of prompting, and clearly involved a basic level of clinical decision-making, albeit rule-based, it could be argued that the hospital was inevitably adopting a degree of clinical responsibility for these patients in addition to the general practitioners.

The questionnaire responses clearly identified an important area which both the author and consultant in charge of the diabetic clinic had not sufficiently clarified prior to the start of the trial. Despite this, most GPs wanted to continue their involvement with prompted diabetic care, and indeed the majority wanted more patients to be included within this framework of care. The question of who bears clinical responsibility needs close consideration and further discussion before the prompted care scheme is expanded.

Optometry questionnaire

Soon after the end of the pilot study a questionnaire was sent to the 14 participating optometrists (working in 15 different locations). Ten completed questionnaires were returned, a response rate of 71%. In reply to question 1 they scored prompted recall of diabetic patients to optometrists for retinal screening 4.0 on a scale 'very poor' = 1, to 'excellent' = 5. On the same scale, their confidence in detecting the following types of diabetic eye disease scored as follows (question 2): background retinopathy 4.3, preproliferative retinopathy 4.0, proliferative retinopathy 4.2. Although only 50% of the optometrists stated that dilation of pupils was their invariable practice with diabetic patients, 80% said they they had always instilled mydriatic drops in the case of study patients (questions 3 & 4).

The optometry review form was scored 4.7 by optometrists on a scale 'useless' = 1, to 'useful' = 5 but on the same scale the form was judged 2.6 and 3.3 for simplicity and provision of space. Several optometrists suggested new sections should be added for recording refraction and intra-ocular pressure measurements. Only half the optometrists had occasion to make a referral to the hospital eye clinic, and all of these had received feedback from this referral

(question 7). All the optometrists wanted to continue their participation in this scheme. They estimated that they currently checked an average 6.3 diabetic patients per month, but felt they had a capacity to see an average of 46 diabetic patients per month. 75% of the optometrists felt that both they, and the hospital, had responsibility for the retinal screening of these patients. One stated that the patients' GP also had this responsibility.

Discussion of optometry questionnaire

The replies revealed much satisfaction on the part of optometrists with their role in providing retinal screening for prompted patients. The responses confirmed the findings of an earlier survey of 11 of these optometrists in 1989 which had found that all them dilated pupils and had access to a tonometer (Yiannaki 1989). At that time, all optometrists expressed a desire for greater numbers of patients to be included in this scheme. This enthusiasm was still present two years later.

The three questionnaires have clearly shown that prompted care, as operated in Islington for 30 months, was popular with all 3 groups of participants. One group whose views it was not possible to sample were those of the junior hospital doctors working in the diabetic hospital clinics of the Whittington and Royal Northern Hospitals. These doctors saw prompted patients in the hospital clinics when patients were referred, but their attachment to the clinic was not sufficiently long to allow them adequate experience of how effectively prompted patients were transferred from the community care setting to hospital clinic follow-up. This aspect of the interface between primary and secondary care will be discussed further in chapter 8, the concluding chapter to this thesis.

Chapter 8:
Discussion & Conclusions

PROCESS AND OUTCOME MEASURES

The Islington study has shown that a prompting system which coordinates structured care of non insulin treated diabetic patients between general practitioners, optometrists and hospital clinics is an effective way to ensure adequate medical care in the community. The standard of care provided by this approach was comparable to that provided in the hospital diabetic clinics of the DGH. In respect of its higher take-up rate by patients, prompted care was *more* effective than hospital clinic care; this was reflected in the lower lost to follow-up rate in the prompted group than in the hospital clinic group. Professional and patient compliance with the prompting regime proved high and the system as a whole was acceptable to all the parties involved.

The process of care findings in this study represent the most important achievement of prompted diabetic care but, as mentioned in Chapter 6, these measures in themselves can only be viewed as an imperfect guide to the standard of medical care patients received. Because the providers of care in this study were a diverse group there are likely to have been considerable differences in the knowledge and skills of the doctors who provided care to the two groups of patients. Despite this qualification, the process of care levels achieved by prompted structured care in Islington are a marked improvement on those of previous UK studies. In the Cardiff trial 14% of community care patients received regular GP review and only 5% received yearly blood glucose estimations (Hayes and Harries 1984). In Kirkcaldy, two thirds of patients received a diabetes review by their general practitioner in the first or second year of a two year study, and only 50% had annual blood glucose assessments (Porter 1979, 1982). In a non randomised study in Ipswich, amongst a group of 209 diabetics discharged to GP care with agreed standards of follow-up, only 25% of patients had their urine tested or blood

glucose level estimated by their GP in the previous two years (Day et al 1987).

Prompted care in Islington ensured very high levels of specific diabetes clinical assessments, such as weighing, blood pressure, foot examination, and retinal examination. There was no evidence of a tail off in these process of care rates in the second year of the study as had been noted in the community care group in Kirkcaldy (Porter 1979). All prompted GP reviews were performed in the context of information concerning recent blood glucose, HbA_1 and albuminuria estimations. This level of clinical assessment compares favourably with the most comprehensive levels reported from hospital clinics, and from GP mini-clinic care (Yudkin et al 1980, Williams et al 1989, Kemple and Hayter 1991, Parnell et al 1993). There were no differences between the two groups in the number of changes of diabetic treatment category, nor in the proportion of patients admitted to hospital for a diabetes-related reason. Though previous studies have documented a higher mortality in the community group (Hayes & Harries 1984, Porter 1979), this was not the case in Islington.

A number of the clinical outcome measures reported in this trial, for example, the proportion of patients with diabetic complications at the end of the study period (see Table 9), need to be interpreted in the light of their being the product of observations by a wide variety of doctors working in routine care settings, and not trained to minimise inter- and intra-observer variability. In addition, even if all patients had been examined at the beginning and end of the trial by a single observer, a median study length of two years is too short a follow-up period in which to expect demonstrable differences in diabetic complication rates (Fuller 1983, Jarrett 1983). Subject to these provisos, there were no significant differences between the two study groups in the proportion of patients recorded as developing the following diabetic complications: lower limb neuropathy, ischaemic heart disease, albuminuria $\geq$ +, or onset of stroke. The small increase in diastolic blood pressure in the hospital clinic group, with a small fall in

the prompted group at the end of the study, are of questionable significance. Reference has already been made to the greater proportion of prompted patients, by the end of the trial, reported to have lower limb ischaemia. This could have been the result of poorly developed GP skills in detecting foot pulses, or the result of a greater initial risk of ischaemia due to the higher level of ischaemia documented in the prompted group at the start of the study (see Table 3).

Mean plasma glucose and HbA_1 values, unlike complication rates, are not subject to observer error and provide useful proxy measures of outcome. The results of this study are in keeping with the findings of Singh et al from Wolverhampton who found no loss in glycaemic control in a non randomised discharge of both Type I & II patients to GP mini-clinic care. The Islington results, though starting at higher initial levels, are also comparable to those recently announced from the Wirral by Baldwin et al (1992). In a non randomised study, this group found only slight deterioration in fasting blood glucose levels in 220 Type II diabetic patients discharged to GP care with 4 monthly computer prompted requests for fasting blood glucose and GP review, but with annual review in the hospital clinic. In the discharged patients, fasting blood glucose levels rose from an initial mean value of 7.6mmol/L to 8.1mmol/L, though mean HbA_1 fell non-significantly from 8.3% to 7.9% after two years follow-up. In Islington, the rise of mean random plasma glucose *within* groups (of 1.3 mmol/L in controls and 1.6 mmol/L) may have been due to a drift in the mean interval between blood test and last meal and was not matched by a significant rise in mean HbA_1 within group.

The Islington results are also comparable to those of Harvey et al (1992) in Aberdeen who found no evidence of loss of glycaemic control and no alteration in the rate of onset of diabetic complications in a group of 258 (Type I and II) patients randomly discharged from conventional hospital clinic care to a system of shared care with GPs. In this study, which also incorporated annual diabetic review in the hospital clinic for the shared care group,

the loss to follow-up rate in the shared care group was zero compared to 14 in the hospital group ($p<0.001$). These results and those in Islington contrast, however, with the findings from Cardiff (Hayes & Harries 1984) where, at the end of the trial, the available measures of HbA_1 indicated worse glycaemic control in the community care group, although there were no pre-randomisation HbA_1 measurements.

It is important to emphasise that previous studies of community diabetic care have equated process of diabetic care received in the case of the community group with 'GP care', and likewise in the case of hospital clinic controls, these studies have equated process of diabetic care received with 'hospital clinic care'. They have not examined process of care by location of care in each group. This means that previous studies have not reported the care received by the community group in hospital outpatients, or the consultation rates of hospital diabetic clinic attenders in general practice.

The Islington study revealed a high unprompted annual consultation rate for both groups of patients with their general practitioner: 8 per patient in the prompted group v 6 per patient in the hospital clinic group. These rates are high in comparison to the national all-reason annual consultation rate per patient of 3.4 for all ages and 4.4 for those aged 65 to 74 (National Morbidity Statistics 1986). The all-reason consultation rate of diabetic patients is believed to be higher than the average though national statistics have not documented this because consultations are recorded by reason for consultation rather than by specific patients with a known diagnosis. However, our results are comparable to the findings of a study of 43 NIDDM patients of the same mean age as Islington study patients; this found an all-reason consultation rate with GPs of 9.6 per patient in the first year of organised diabetic care in two general practices in Southampton (Murphy et al 1992).

Of the unprompted consultations with GPs for both groups in the Islington study, consultations in which mention of diabetes was made in the GP notes, or a specific diabetes clinical assessment was

documented, or a diabetic measurement was made or requested were classified as diabetes-related consultations. In the prompted and hospital clinic group, the average annual diabetes-related consultation rates were 2 and 3 respectively (see Table 5). For evaluation purposes diabetes-related consultations with GPs were not counted as structured care. Analytically, these consultations constitute ad hoc GP care of diabetes; this consultation rate did not significantly differ between groups. Prompted structured care therefore seemed to have no significant 'knock on' effect upon neither the all-reason consultation rate of diabetic patients with GPs, nor upon the diabetes-related consultation rate.

PRIMARY CARE/SECONDARY CARE INTERFACE

In the Islington study, a third of all structured diabetic reviews in the prompted group occurred in hospital outpatients. These consultations, it is contended, do not detract from the effectiveness of the prompted care package as a whole. Rather, they reveal that effective community care needs to allow for easy referral to and from hospital clinics. A two thirds/one third apportionment of total doctor patient contact for structured diabetic review between community and hospital in a $2^1/_2$ year period is a significant achievement in the case of seasoned hospital attenders who have been discharged from 'their hospital' clinic (Beardshaw 1992).

Some 40% of prompted patients who were reviewed in hospital diabetic clinics were seen as a result of referrals *outwith* the participating GPs. As already discussed, these patients were referred by other hospital outpatient departments and following in-patient episodes; five patients changed their minds about accepting prompted care after the start of the study; for a few patients, the route by which they found their way back to the hospital clinic could not be identified - some patients may have referred themselves.

In the case of the prompted patients who were referred from *within* the prompting system, the referral letter stated that the patient's normal care involved community prompting. A label in the outpatient

notes advised the clinic doctor that the patient should be assessed in terms of the particular reason for referral and, in the absence of any complicating factors, should be discharged back to prompted care (see Figure 7). In this way, it was hoped to minimise the number of prompted patients who might become 'trapped' in hospital outpatients as a result of referral. However, on reviewing the hospital notes of prompted patients seen in hospital diabetic clinics, it was frequently difficult, in many instances, to discern why a patient had been given another hospital clinic appointment rather than being discharged back to prompted care in the community. This was also true in the case of patients who found their way back to the hospital clinic without referral from within the prompting system. In this situation, there was no label in the hospital outpatient notes to advise the reviewing doctor to discharge the patient back to prompted care. Although the hospital notes of all prompted patients had been stamped with a notice to this effect, if the notice was not immediately apparent to the reviewing doctor, and the patient did not strongly identify with prompted care, there was little to indicate to the clinic doctor that this patient usually received prompted care. The low visibility of the prompted community care scheme in the hospital clinic was partly a function of the small size of the study; the reappearance of 52 prompted patients in hospital clinics over $2^1/_2$ years amounted to only 1% of the total number of patients seen in these clinics (see Table 6). An adequate awareness amongst the staff of hospital clinics about existing arrangements for community care is essential if patients are not to be 'sucked back' into hospital clinic care following referral.

The different routes by which a high proportion of the prompted group returned for review in the hospital diabetic clinic probably reflects the influence of several factors upon the partition of care between primary and secondary care. Nationally, all-reason hospital referral rates by GPs are extremely variable with little consensus about which factors most influence referral (Acheson 1981, Acheson 1986, Wilkin & Smith 1987, Morris & Roland 1988, Moore & Roland 1989, Bradlow et al 1992, Roland & Coulter 1992). Although some studies have concentrated on influences acting upon the threshold of

patient referral from GP to hospital, little is known about the factors which influence the number of subsequent hospital consultations after referral, hospital follow-up intervals, or the rate of discharge back to GP care. One study has shown that the adoption of simple clear guidelines in hospital outpatient clinics can have a decisive effect upon these process measures in a hospital general medical clinic (Hall et al 1988).

In the case of diabetes, approximately 13% of all diabetes-related consultations with GPs nationally result in hospital referral (National Morbidity Statistics 1979), but little is known either about the determinants or appropriateness of these referrals. Referral studies not specifically concerning diabetes have tended to focus upon thresholds influencing patient 'flows' across the primary secondary interface rather than upon factors which might have an influence upon the 'volume' of patients who can be contained within primary or secondary care. The author has not been able to find studies which chart the pattern of primary and secondary care received by a cohort of diabetic patients over a period of time. A retrospective study of the diabetic notes in 7 non mini-clinic practices in Southampton (Burrows et al 1987) found a falling trend for GPs to refer newly diagnosed NIDDM patients to hospital clinics over three periods: before 1975, 1975-79 and post 1979. The authors comment that this finding is in keeping with GPs assuming increased responsibility for the care of patients with chronic conditions generally. This conclusion is also supported by National Morbidity Studies which have shown a trebling in the patient consulting rate for diabetes over the period 1955-1981 (National Morbidity Statistics 1986) However, such studies provide only 'snapshot' pictures of the pattern of diabetic care. What is needed is a record linkage study (Acheson 1968) of the care of diabetic patients in a locality. This could yield the information needed to properly inform attempts to reconstruct rationally the relationship between primary and secondary care in the case of this complex chronic disease.

PROMPTED CARE AND THE NHS REFORMS

Purchasing health authorities can be expected to have an increasing

interest in factors which influence patient flows between primary and secondary care, particularly in the field of diabetic care (NHS Management Executive 1993, South East London Commissioning Agency 1992). The Islington prompted study has shown that it takes more than an agreed division of responsibility for diabetic care between general practitioners and hospital diabetologists to prevent the tendency of previous patterns of care to reassert themselves. Good control of the primary/secondary care interface will require newly established patterns of care to have a high profile within a district. Patients, as well as GPs and hospital clinic doctors need to have a clear understanding of which system of care a patient 'belongs' within in default of a particular hospital referral. For care of chronic conditions to be successful, an adequate awareness of new default patterns of care by health professionals is likely to become as important, under the new arrangements in the NHS, as knowledge of which medication a patient is taking.

During the period of this pilot project, the new GP contract came into effect (April 1990). This meant that whilst the Islington study was in progress many of the participating practices were reviewing their organisational arrangements for the care of chronic diseases in general, and diabetes in particular. The new contract provided for additional payment to GPs for setting up specific disease clinics in their practices, including diabetic mini-clinics. For a variety of reasons, including concern about a fragmentation of general practice into a mini-outpatient clinic, and the undesirability of a disease orientated approach to primary health care, many general practitioners are not persuaded of the appropriateness of a mini-clinic approach to the care of specific diseases (Foulkes et al 1989, Hurwitz and Yudkin 1990, Soler and Jones 1993). Inner city practices are frequently without the space or the attached/employed staff necessary to make a mini-clinic approach to the care of a single disease worthwhile (Main & Main 1990) and it may be difficult for them to access key services for diabetics such as dietetics (Pringle et al 1993). Some of these factors have been strongly reflected in Camden and Islington over the past 10 years (Elliott 1983). Though by 1991 77% of practices in

England had responded to the financial incentives in the new contract by setting up specific clinics, only 56% of GPs in Camden and Islington had made *any* payment claims for such clinics (National Health Service Management Executive 1991). Despite financial incentives and a deliberate policy of supporting the development of mini-clinics in Islington (see Chapter 2 and Appendix 4) mini-clinic sessions have not proved popular locally. This makes the prompted approach to diabetic care in Islington all the more important.

As a result of alterations to the new GP contract due to come into effect in July 1993 financial incentives for GPs to run mini-clinics will disappear completely (NHS Management Executive 1993). Structured prompting of diabetic care, because it does not impose the organisational and resource demands of mini-clinics, could therefore gain in popularity. Under the amended new contract GPs will be paid an additional amount for providing a programme of care for two chronic diseases only, diabetes and asthma. Payment will no longer be linked to special clinic sessions but instead will be linked to demonstrating that the practice can meet a series of diabetic care objectives. These are that:

-the practice maintains an up-to-date register of patients with diabetes

-systematic call and recall of diabetic patients occurs *either* in hospital or in general practice

-the practice provides advice to newly diagnosed patients

-all patients with diabetes receive continuing education

-each diabetic patient receives an individual management plan

-each patient is offered an annual review of their condition including anticipatory checks for the onset of complications

-the practice coordinates care appropriately with other health carers such as dietitians and chiropodists

-the practice maintains adequate records of diabetic care and audits the care programme.

Almost all of these requirements are encompassed by the aims and objectives of the Islington prompted care system (see Chapter 4). Exceptions relate to three areas only: newly diagnosed patients, the provision of individual management plans, and easy access to continuing diabetes education. Only a small amount of re-customisation of the prompted care system would be necessary to enable practices to meet the above objectives by participating in prompted care, thereby claiming accreditation and payment for diabetic care under the new arrangements. More GPs may then be attracted to this method of ensuring structured care, without incurring the additional expense of running special clinics. Though prompted care in Islington was originally developed to structure the care of already diagnosed patients rather than provide a management package for newly diagnosed diabetics, a protocol for newly diagnosed patients could easily be incorporated. For example, newly diagnosed patients could be referred to the local hospital diabetic clinic, where initial assessment and stabilisation could occur together with patient education. Following this, with patient and GP consent, a decision could be made to enter a patient into the prompted care system of follow-up, or to retain the patient within a conventional hospital clinic programme depending upon individual circumstances. A different scenario might involve the GP in performing baseline investigations and assessments in a newly diagnosed patient, with the option of then referring the patient to the local diabetic unit for intensive education after which prompted care could become operative.

In terms of the objectives of diabetic care contained in the modified GP contract as described above, the decision to enter a patient into prompted care would constitute, in this context, an individual management plan because it would specify a minimum frequency of clinical review, together with the level of monitoring and the degree of compliance expected by both doctor and patient. Although the current design of Islington prompted care does not provide for continuing diabetic education of patients, design modifications which incorporate annual or two yearly prompts offering patients an education session with a district diabetes

education nurse are clearly possible (Hurwitz et al 1993).

WIDER APPLICABILITY

Of the 570 patients whose hospital notes were reviewed prior to inclusion in this study, 73% were judged to be medically suitable for prompted community care by criteria generally accepted by diabetologists (see Figure 8). A prompting approach could therefore become appropriate for the structured care of a significant proportion of non-insulin treated patients. In such a scheme, patients could be selected for inclusion from local hospital clinics, as in this study, or GPs might elect to enter their patients into a prompting system instead of hospital clinic referral. Alternatively, the design of a prompted care framework might incorporate hospital clinic review at 2-3 yearly intervals as a compliment to more frequent GP and optometry review.

Prompted care of Type II diabetes may be particularly suited to inner city areas, and London in particular. A high proportion of GPs in the inner city work in single-handed or in small sized partnerships from unsuitable premises, and with a lack of support staff (Acheson 1981, Jarman 1978, 1981, Elliot A 1983, Bosanquet 1987, Marks 1987). It is generally considered that inner London's GPs have failed to develop primary health care teams to the same extent as have their colleagues in the rest of the country (King's Fund Commission 1992). As a group, these GPs score poorly on many measures of structured care in general:

> 'The proportions of London GPs on the minor surgery list, or meeting high targets for childhood immunisation and for pre-school boosters, are around a quarter of those found elsewhere. The proportion achieving high targets for cervical cytology is only a tenth of the all-England figure... 46% of GP premises in the four inner London FHSAs are below minimum standards, compared with an England average of 7%. London has three times the national percentage of GPs over age 65; twice the proportion of single-handed GPs... ' (Tomlinson 1992).

The present-day context of inner city primary care goes some way towards explaining why a mini-clinic model of diabetic care failed to be adopted by GPs in Islington. It also makes the achievement of prompted diabetic care in Islington all the more impressive.

A major factor responsible for this success was revealed by the GP questionnaire; responses indicated that prompted clinical review interfaced well with the many other commitments of inner city general practice, and did not make too great a demand upon the time or resources of participating practices. This feature of prompted care is likely to be of great appeal to inner city GPs when all mini-clinic payments cease in July 1993. On the other hand, the high mobility of inner city populations could compromise the adoption of this type of diabetic care. Though patient turnover is undoubtedly high in inner city areas (Jarman 1978, 1981, Acheson 1981) this need not compromise prompted care if patients are selected appropriately. With an average age of Type II diabetic patients approaching 60 years, as in this study, social mobility can be expected to be lower than that of the inner city population as a whole. This conclusion is supported by the high level of attendance of the prompted group in the Islington study in which care was clearly not compromised by patient mobility over a $2^1/_2$ year period.

Prompting has so far been the responsibility of the hospital provider unit in Islington. However, the local purchasing authority has now expressed interest in expanding the number of participating patients involved in the scheme. A number of options are under consideration, including prompted care as an alternative to conventional hospital clinic care, or prompted GP care combined with 2-3 yearly review in a hospital clinic. The value of such a prompting system has been recognised by all UK Regional Health Authorities who have commissioned a Diabetes Care System from the Family Health Services Computer Unit (Family Health Sevices Computer Unit 1992). The overall aim of this system - to recall patients for appropriate diabetic care by their GP or at a local diabetic clinic - is consistent with that of Islington prompted care and is further discussed below.

COMPUTER PROMPTING

Several studies have looked at the usefulness of computer registers in the follow-up of chronic disease (Beilin et al 1974, Petrie et al 1985, Bulpitt et al 1976, Jones et al 1982) with focus upon diabetes

in particular (Jones et al 1983). Computerised registers of hospital clinic attenders have been developed to generate structured records to act as implicit prompts for doctors to ask patients appropriate questions, perform particular clinical examinations, or request certain kinds of investigations. Such systems are designed to prompt only in the same sense in which a structured manual record, particularly if it contains time-related data, may also implicitly prompt doctors to perform certain procedures (Williams CD et al 1988). Such systems have not been confined to hospital clinics; some have also mailed structured letters and records to GPs and patients (Bulpitt 1976, Jones et al 1983, Morris et al 1984).

Outside the field of diabetic care, explicit computer generated prompts to doctors concerning the need for particular interventions, or follow-up, have shown that process of care can be improved according to agreed protocols (McDonald 1976, McDonald et al 1984, Turner et al 1990). Diabetologists in the UK have been in the forefront of developing clinical computing applications (Hill 1986a 1968b, Williams CD et al 1988) including an expert systems approach (Williams CD et al 1989). In Southampton, a computer system was set up in 1986 to prompt patients for blood tests with clinical review in either general practice or hospital (Callaway et al 1988). In 1988 73% of the estimated total district population of 5500 diabetic patients was registered on the computer which was able to support diabetic care in 15 general practices at that time. In Wakefield, a micro-computer has been programmed to send prompts for blood glucose estimations to Type II patients discharged from the hospital clinic who fail to have such tests performed 6 monthly. If patients miss their scheduled blood test by 2 months, or more, they are prompted and the appropriate GPs are notified. In addition, all patients are prompted for 3 yearly review in the hospital diabetic clinic. No evaluation of this system has yet been published, but it has been judged by the consultant in charge of the initiative 'a qualified success' (Burr 1990).

As already mentioned, Baldwin et al (1992) have piloted a system of 4 monthly computer prompted requests to Type II diabetic patients

for fasting blood glucose, followed by GP review and annual review in the hospital clinic. It is not clear from the report whether this system also involved the use of structured records in general practice or hospital. However, a two year uncontrolled follow-up has shown encouraging maintenance of glycaemic control in these patients. Harvey et al (1992) have reported a randomised controlled trial of conventional hospital clinic care of Type I and II diabetes versus integrated patient care. In this scheme shared care consists of 4 monthly appointments and recall to GPs and annual hospital review coordinated by a main frame computer system. The study has shown no loss of glycaemic control in the integrated care group after 2 years of follow-up.

The Islington prompted care approach does more than simply 'nudge' patients, doctors and optometrists to comply with a medical management regime. It also supplies participating GPs with a time-related medical summary of information relevant to the diabetic care of each patient. Does the feedback role have an independent effect upon quality of care? An interesting study in Toronto has looked at this question; it examined the role of computer *feedback* to GPs on hypertensive patients prompted to receive primary care according to an agreed protocol (McAlister 1986). The study showed that GPs who received computer feedback which included information about the stepped protocol of care in use, together with ranked patients' diastolic blood pressure by percentiles, achieved a significantly greater reduction in the diastolic pressure of their patients than the prompted patients of GPs who received no such feedback. This study suggests that the structure provided by prompting, including feedback of relevant information, may be as important in the delivery of care as the prompting itself.

Prompting as in Islington has created opportunities for structured audit of diabetic care. The updated longitudinal record of the medical care of each patient, which is at the hub of the prompting system, could provide valuable data for on-going medical audit. The longitudinal record contains three types of data basic to audit:

1 Measures of patient contact with diabetic health care

providers including dietitians and chiropodists

2 Process of care measures gathered from the frequency of laboratory estimations of glycaemic control and albuminuria, and the frequency of process of care measures provided by feedback from consultations with GPs, hospital diabetic clinic doctors, optometry and hospital ophthalmic assessments

3 Outcome measures from the processes in 2 above.

Review of the above measures, at appropriate intervals, could provide data to enable the first half of an audit cycle to be undertaken. If data presented in Chapter 6 of this thesis were generated routinely, the performance of prompting could be monitored and the extent to which the objectives of prompted care were met could be assessed. By making adjustments to the prompting system in the light of such information an audit cycle could be completed, narrowing the gap between the objectives of care and their specific performance (Sheldon 1982). Comparisons could also be made with hospital diabetic clinic care, due allowance being made for differences in case-mix.

For data to be made easily and regularly available for audit purposes the prompting system would ideally need to be computerised. This is also true if a significantly larger number of patients were to be cared for within a prompted care framework. For example, 1000 patients within the current Islington framework would lead to 2000 prompts for blood and urine tests annually and the need to store and process 6000 sets of laboratory results on HbA1, plasma glucose and albuminuria levels. 2000 patient prompts for GP review would be generated with the consequent need to process and store feedback information. 800 prompts for optometry review would result annually, and feedback information would also need to be stored and sent to the relevant GPs. The prompting system would be called upon to make approximately 100 referrals annually to the hospital diabetic clinic with 100 referrals to dietitians and chiropodists. Approximately 50 referrals for hospital ophthalmic review annually would need to be coordinated by the promting system.

It is evident that considerable data processing would be required together with a carefully designed and flexible reporting structure to allow the coordination of community diabetic care for 1000 patients. To date, the Islington prompting system has only been piloted manually, using paper files and card indexes. However, this has conferred a number of advantages; it has allowed the goals set for the project to be the main determinant of the system design rather than such goals 'refracted' by the requirements of a computer model. It has also allowed the protocol to be fine tuned easily without constraints imposed by technology or software adjustment. The result is a proven system that can achieve, on a small scale, everything required of a computerised system (Stanley 1991).

This approach to development can be viewed as an example of 'inverse technology' in which the principles of database management in the manipulation of information come first, and those of computer science come second (Golden and Friedlander 1987). The approach has conferred the benefit of providing a working system that can be used to 'shadow' and test a computerised version which has now been achieved, albeit partially. A computer specification and rule-base has been developed, written in the semi-relational database Revelation (Revtech UK, Basingstoke) and based upon the manual protocol (see Appendix 6). It functions in the following way: on a monthly basis, a personal computer (IBM clone) produces lists of patients due to receive prompts; it prints the clinical review forms incorporating a summary of previous feedback data for each patient. The system, as currently written, still requires some supervision and monitoring; certain aspects of the prompting cycles are not yet automated such as the production of laboratory request forms. The system overrides are not yet computerised and a re-write using a fully relational database software is underway.

The next version of computer prompting in Islington will incorporate the current system together with an already existing register of resident diabetic patients in the district. The register, compiled from information supplied by GPs, the hospital diabetic clinics, and returns from the Prescription Pricing Authority is held by the

hospital provider unit (Burnett et al 1992). It is envisaged that in future, this register will become the natural reservoir from which expansion of prompted care could be accomplished in Islington by drawing upon appropriately selected patients.

There are indications that the 'climate of opinion' (Stocking 1987) may now favour a prompted care approach to supporting the care of diabetes in the community. A recall system to assist in diabetic community care has been commissioned from the Family Health Services Computer Unit by a group of 'stake holders' whom include all the Regional Health Authorities (Family Health Sevices Computer Unit 1992). The objectives of the system are to develop software to:

'1 Maintain a register of diabetics at the FHSA with information stored to identify organisations caring for the individual

2 Recall diabetics at regular intervals as selected with appropriate notifications

3 Provide details of changes in individual's registration of information to other organisations with diabetic registers

4 Record information on tests and examinations carried out at patient reviews together with associated clinical results and outcomes

5 Provide a system based on the minimum level of care as outlined in both the British Diabetic Association's Patient's Charter and the St Vincent declaration.' (Family Health Sevices Computer Unit (1992).

This system will apparently be designed to handle some 8000 patients. It is envisaged that it will function by prompting annual review of individual patients by a 'lead clinician', either the GP, or local consultant diabetologist. The details of this package are currently under consideration by a working party consisting of representatives of 4 FHSAs and a commissioning authority, a GP and a consultant diabetologist. Whatever the final product which emerges, it will need to allow for considerable flexibility of local arrangements.

It is not yet clear how Regional Health Authorities or their constituent FHSAs envisage the implementation of such a system. One option might be to set up a national recall programme for diabetic care, coordinated by FHSAs, along the lines currently in operation

for cervical cytology and breast screening. Another option might be to offer the package for sale to interested purchasing authorities or conglomerates of fund-holding practices.

EYES

Responsibility for retinal screening in the Islington study lay with optometrists unless, at the start of the trial, the patient was already under the care of a hospital eye clinic. After allowing for the much higher non-attendance rate in controls, the annual rate of eye examination per patient, and the number of patients referred to a hospital ophthalmic clinic, process and outcome measures were comparable in the two groups (see Chapter 6). The larger number of cataracts recorded in the prompted group probably reflected the diligence of optometrists in noting and documenting these defects compared to doctors in the hospital diabetic clinic. It is recognised that without standardisation and training of both the optometrists and doctors involved in eye screening, such measures, along with those of recorded retinopathy are only 'soft' measures of outcome because they are subject to inter and intra-observer variability. Despite these limitations, there is little reason not to grant the outcome measures in respect of retinal screening a degree of credence.

It is now recommended that all diabetic patients should receive retinal screening annually by a method and operator capable of detecting diabetic retinopathy (International Diabetes Federation and St Vincent Declaration Steering Committee of WHO Europe 1991), and annual retinal screening has recently become the standard of care to be achieved by responsible clinicians to ensure that a claim of negligence could not succeed (Brahams 1992). In the Islington study, the Whittington hospital clinic nearly achieved this frequency of screening by dilated fundoscopy in the control group (see Table 10). By comparison, a recent audit of 716 patient notes from 2 different hospital clinics in the West Midlands found that retinal screening had been accomplished in only 62 and 69% of clinic patients in the previous 2 years (Parnell et al 1993).

However, even if hospitals could routinely achieve annual retinal screening of all diabetic patients attending outpatient clinics this would still leave the 50% of non hospital attending diabetic patients unscreened. Studies have indicated that in the absence of a special interest (Vercoe 1987), most general practitioners are not able to screen for diabetic retinopathy reliably without further training (Finlay et al 1991, Featherstone et al 1992, Stead and Jacob 1992). On the other hand, studies have shown that optometrists can screen effectively for the presence of serious diabetic retinopathy (Hill 1981, Foulds et al 1983). A study in Bristol revealed that optometrists could successfully detect serious diabetic retinopathy with a sensitivity of 87% and a specificity of 94% (Burns-Cox and Hart 1985, Bhopal and Hedley 1985). When optometrists in Oxford were asked to screen diabetics in a service setting, as in Islington, they achieved a lower sensitivity than that recorded in the Bristol study, but the specificity remained high at 95% (Buxton et al 1991) and offered the most cost effective method per patient screened (Sculpher et al 1991). For these reasons, there have been calls for a nation-wide community based retinal screening programme to encompass detection of retinopathy by optometrists with referral on for further assessment and treatment by ophthalmologists (Rohan et al 1989a, Shotliff and Herbert 1993).

Patients with diabetes are entitled to free eye-tests by optometrists. The accessibility and acceptability of optometry screening to patients in Islington was revealed by both the high compliance with eye screening arrangements and the questionnaire responses. The evident enthusiasm of optometrists locally to take on this role suggests that a district wide retinal screening service would be feasible. Such a service is now under development in Islington and aims to use the district register of resident diabetic patients to ensure annual optometric assessment of all diabetics who are not already attenders at a hospital ophthalmic clinic.

CONCLUSIONS

This thesis has charted a shift in the centre of gravity of diabetic care in the UK over the past 30 years. During this period, there have been moves to re-locate provision of care for many patients with diabetes away from the traditional hospital clinic, and towards primary care.

An initiative to promote the development of GP mini-clinic care in Islington between 1983-85 has been reported. Difficulties were encountered and it was concluded that this approach could usefully be supplemented in inner London by a prompting system to support community diabetic care. By coordinating care within a network comprising GP, optometrist, biochemical laboratory, dietitian, chiropodist, hospital diabetic and eye clinics, prompted care provides the opportunity not only to encourage structured care in the community, but also to routinely audit the pattern of diabetic care, the process of care, and medical outcome.

Prompted care of Type II diabetic patients in Islington, as described in this study, has been found to be a safe and effective way to organise care in the community. It offers an alternative model of structuring primary care to that of the GP diabetic mini-clinic. This approach has potentially wide applicability, particularly in areas with a large proportion of small general practices such as inner city localities.

It has been argued that the NHS reforms currently underway may favour the adoption of this approach to the community care of Type II diabetic patients. The overall design of prompted care can be varied according to evolving standards of good care, and in response to differing local needs, health care resources, and the requirements of health purchasers. In order to become feasible on a wider scale, prompting will need to be computerised. This process of computerisation is under development locally in Islington, and nationally in the West Midlands by the Family Health Services Computer Unit.

Appendices

List of Appendices

Appendix:

Appendix 1: Programme of educational meetings 1983-4.

Copies of 6 hand-outs distributed at meetings with GPs during 1983 covering the following aspects of diabetes:

- Inheritance, prognosis and pathology of diabetes
- Oral hypoglycaemics
- Insulin
- Diabetic eye disease
- Home monitoring of diabetes
- monitoring diabetes in the surgery.

Programme of symposium with GPs which discussed the management of diabetes in GP mini-clinics, November 1984.

(A number of other educational meetings were organised for participating GPs between 1985-6. See also Appendix 7).

GP SEMINAR 1 15/4/83

INHERITANCE, PROGNOSIS + PATHOLOGY OF DIABETES MELLITUS

DEFINITION

A metabolic disorder of complex + multiple aetiology characterized by a varying degree of hyperglycaemia.
By analogy cf Jaundice, Anaemia
But DM (generally) life-long in fact or tendency with or without treatment.

Plasma glucose is a continuous variable. Defining DM as that condition occurring when the glucose concentration is higher than a given threshold (under standard con ditions) reveals a spectrum of disease. There is no simple dichotomy of case/non-case in population terms.

DIAGNOSTIC CRITERIA

Condition	Fasting Plasma Glucose		*2 hr Post GTT Plasma Glucose
DM	$\geq$ 8 mmol/L	+/OR	$>$ 11 mmol/L
Impaired GT	$<$ 8 mmol/L	+	$\geq$ 8 - 11 mmol/L
Normal GT	$<$ 8 mmol/L	+/OR	$<$ 8 mmol/L

* Glucose Load 75 G (or 1.75 G/Kg)

IMPAIRED GT

Prognostically (1) 2-4% per year worsen to DM
(2) Increased risk macrovascular disease, viz. Ischaemic Heart Disease
Strokes
Leg vessel lesions

A small % of those with DM may move into Impaired GT group spontaneously. In population terms:

Normal GT ⟶ Impaired GT ⟶ DM

CURRENT TYPOLOGY

I Insulin Dependent DM (IDDM)
1a

1b

II Non-Insulin Dependent DM (NIDDM)

GENETICS

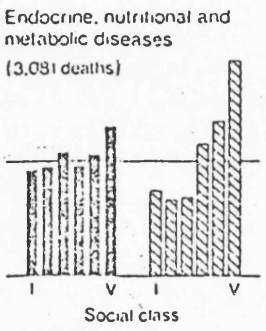
Identical Twin Studies

	Concordant	Discordant	TOTAL (*)
IDDM	88	78	166
NIDDM	54	11	65

CLASS DISTRIBUTION

Incidence:

Mortality:



Social class	SMR for diabetes 1921-3	1930-2	1949-53	1959-63	1970-72
I	129	122	134[1]	81	83
II	149	155	100	103	93
IIIN		95	99	100	111
IIIM	93				98
IV	75	82	85	98	111
V	66	69	105	122	128

[1] *SMR for Social Class I distorted by the inappropriate classification of company directors*

OPCS

PROGNOSIS

COMPLICATIONS

CONTROL

ORAL HYPOGLYCAEMICS

NOT the answer for non-insulin-dependent diabetics;

a) Should not be used until adequate trial of diet unsuccessful

b) Should be combined with diet, not used as an alternative.

Some patients do not respond (primary failure)

Some patients respond at first, then escape (secondary failure).

---

2 GROUPS - Sulphonylureas - Chlorpropamide (Diabinese)
Tolbutamide (Rastinon)
Glibenclamide (Euglucon, Daonil)

- Biguanides - Metformin (Glucophage)

	Sulphonylureas	Biguanides
Use in	Normal weight patients	Overweight patients
Tend to	Increase weight	Reduce weight
Increased effect with	Aspirin, phenylbutazone, sulphonamides	-
Combination	With biguanides, not with each other	With sulphonylureas

	Duration	Starting Dosage	Dosage Maximum	Cost/month	Avoid in
Chlorpropamide	36 hrs	100 mg od	500 mg od	£0.90	Oedematous states
Tolbutamide	6 hrs	250 mg bd	1 G tds	£1.21	Oedematous states
Glibenclamide	8 hrs	2.5 mg od	(15 mg bfkst) (5 mg lunch) (5 mg supper)	£5.78	
Metformin	6 hrs	500 mg bd	850 mg tds	£2.16	Liver/kidney disease, after myocardial infarc

	Hypoglycaemia	Other side effects	Comments
Chlorpropamide	Rare if patient well-monitored. Avoid by instructing to stop tablets if not eating or losing weight.	GI upsets, rashes. Jaundice, blood disorders (rare) Flush with alcohol.	
Tolbutamide	Rare	GI upsets, rashes. Blood disorders (rare).	
Glibenclamide	Common & severe 2-3 hrs.after dose (30%)	GI upsets, rashes. Blood disorders (rare).	Can use in oedema states or (Tolbutamide, Glipizide.)
Metformin	Rare.	GI upsets (common) Lactic acidosis (rare).	

LONG TERM BENEFITS DEBATABLE. SUSPICIONS OF RAISED MORTALITY WITH ORAL HYPOGLYCAEMICS PROBABLY UNFOUNDED.

INSULIN

Needed for 1) Patients who develop ketoacidosis (for life)

2) During pregnancy, surgery, acute illness (maybe temporarily)

3) Oral hypoglycaemic failure - primary
- secondary.

This may manifest as weight loss with ketonuria, or as uncontrolled hyperglycaemia.

Insulin types (* indicates highly purified pork insulin).

Short acting	Soluble,	Neusulin,	Velosulin*, Actrapid*
Intermediate acting	Isophane	Neuphane	Insulatard*
	Semilente	Semitard*	
	Lente	Lentard	Monotard*
Long acting	Ultralente	Ultratard	
	Protamine zinc		
Mixtures	Mixtard*	Initard*	Rapitard

Note that MC does not mean the same as highly purified pork insulin.

Antibodies to insulin - effects may or may not be harmful.

6% of patients on beef insulin get bad effects
- lipoatrophy
- allergy

Otherwise use low-immunogenic insulin (pork, ?human)
for - intermittent treatment
- new patients.

Injection technique

Re-use disposable syringes one month in fridge needles until blunt.

No swabbing or drawing back.

Can mix any insulin - except old Soluble and (Semilente / Lente

If mix Soluble and PZI, draw up Soluble first.

Insulin regimens

One injection of long acting insulin or intermediate acting insulin a day for:-

i) patients in whom good control not important (eg the elderly).

ii) patients who can produce their own insulin to cover meals.

Otherwise better to use two injections per day for - flexibility
- better control.

Soluble and Isophane twice daily.
Soluble and Semilente/Lente twice daily.
Soluble twice daily and Ultralente once daily.

Soluble insulin lasts 4-8 hours. Give injection 30-45 minutes before meal.

The Pump - still experimental.

Injection sites

Arms
Abdomen
Buttocks
All of thighs except groins.

Rotate within one site - if inject into same place, poor absorption.

Lipoatrophy rarely seen with highly purified insulin.

U100

No change in types of insulin.

More concentrated solution.

Syringes will contain 100 lines per ml.

Intercurrent illness

NEVER cut insulin dosage if patient ill and not eating.

May need more insulin.

Monitor blood glucose.

Cover insulin with liquid carbohydrate.

If can't keep anything down, see a DOCTOR - may need a drip.

Adjust doses

According to blood glucose. Increase, decrease by 10% at a step (or more if severe hypos).

Excessive insulin may give weight gain and depression without hypos.

DIABETIC EMERGENCIES

Ketoacidosis

1) Prevention

Early self-referral if high glucose levels
ketonuria
vomiting

Treat factors likely to cause it, eg infections.

Maintain fluid intake.

NEVER drop insulin dose when ill, even if nauseated or anorexic.

May need MORE INSULIN

Give Ketostix for regular use if patient has recurrent ketoacidosis.

2) Covering illness in insulin-treated diabetic

Increase insulin to cover illness by 10–20% or according to patient's experience.

Monitor blood and urine glucose and ketones closely.

More insulin still if levels high.

If anorexic, cover insulin with liquid carbohydrate according to blood tests.

ADMIT if unable to keep anything down.

3) Diagnosis

Suspect if patient hyperventilating
vomiting
thirsty/polyuric
dry mouth/dysphagic
weak
abdominal pain.

Test urine glucose and ketones if any of these in
- known diabetics
- unknown diabetics.

DON'T WAIT UNTIL COMATOSE - 50% mortality.

4) Coma

Measure blood-glucose - may be high or low.

5) Ketonuria

Trace - can ignore
+ or ++ may occur in starvation but usually mean insufficient insulin.

Can treat at home by increasing insulin if
- not vomiting
- not hyperventilating
- not dehydrated
- GP happy
- patient happy
- adequate and frequent supervision and monitoring of blood and urine.

6) Admit if

hyperventilating
vomiting
drowsy or impaired consciousness
dehydrated
ketones ++
underlying serious illness - pneumonia
- myocardial infarct.

7) Progress

Mortality 5-8%, usually from underlying illness.

Usually develops over 2-3 days but more rapidly if
- stops insulin
- severe underlying condition.

May be more rapid in children.

Hypoglycaemia

Usually in insulin treated patients.

Maybe with glibenclamide (2-3 hours after dose).

Occasionally with chlorpropamide if weight loss, anorexic or inappropriately prescribed (may be prolonged).

May be asymptomatic, especially at night.

Suspect if
- Nightmares
- Morning headaches
- Weight gain.

1) Symptoms - depend on speed of onset.

RAPID ONSET (QUICK INSULIN)
↓
SLOW ONSET (SLOW INSULIN)

- Hunger
- Sweating
- Palpitations
- Visual disturbances
- Light headedness
- Paraesthesias
- Drowsiness, lassitude
- Altered behaviour, amnesia
- Hemiplegia, nerve palsies
- Fits

COMA.

2) Diagnosis

Not - dehydrated
- hyperventilating

Bounding pulse
Sweating
Occurs in minutes/hours, not days.

If in doubt - do BM stick or Dextrostix
- treat anyway as if patient has hypoglycaemia
(safer than not treating, even though may put up glucose in normoglycaemic/hyperglycaemic)

3) Treatment

IM glucagon 1 mg safer and easier than iv glucose (25%
(50%

If no response in 5–10 minutes suspect
alcohol
trauma
stroke.

Adjust treatment /Education to prevent recurrence.

Glucagon to partner/relative if frequent severe hypos.

DIABETIC EYE DISEASE

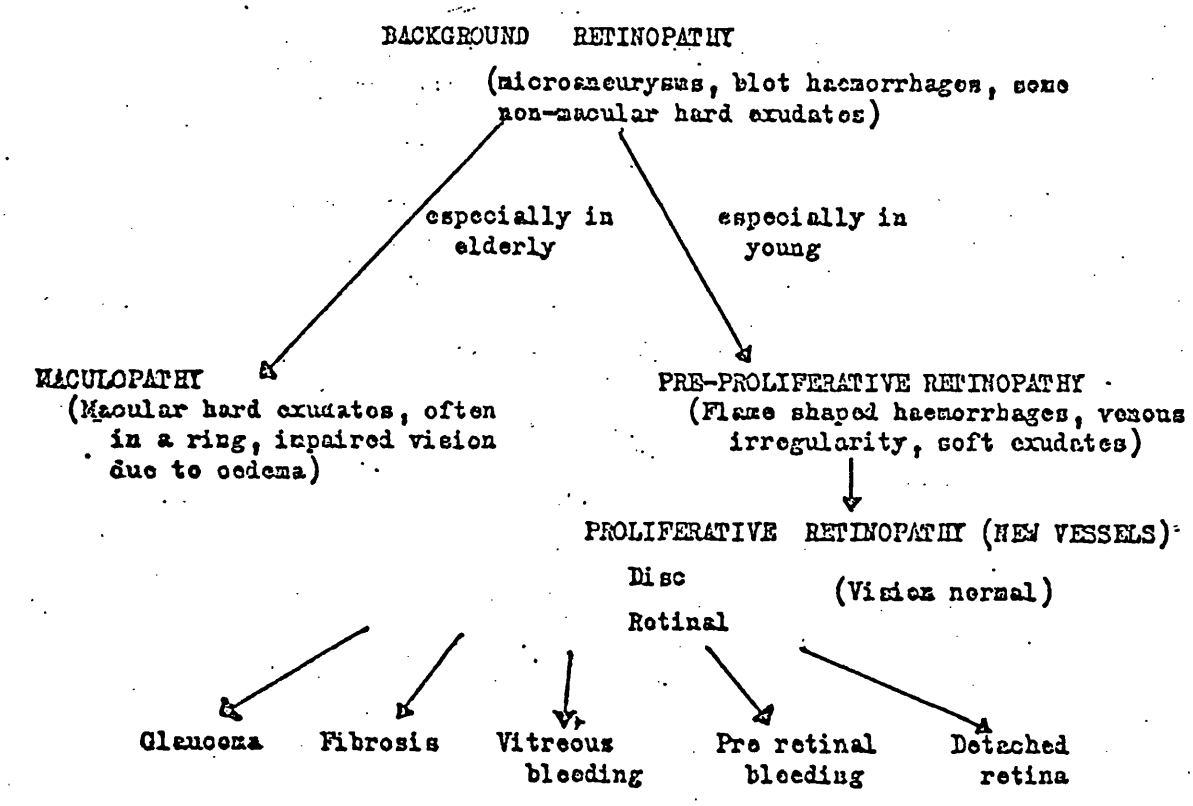
Diabetic retinopathy is responsible for 15% of all blind registrations.

Mostly women. Mostly over 60 years. Worse if poor control.

2% of diabetics will go blind.

After 20 years' diabetes, 80% have some retinopathy.

If under 29	with	microaneurysms,	0%	blind	at	5	years.
" "	"	haemorrhages/ exudates	4%	"	"	"	"
" "	"	new vessels	30%	"	"	"	"
over 29	with	microaneurysms	12%	"	"	"	"
" "	"	haemorrhages/ exudates	24%	"	"	"	"
" "	"	new vessels	70%	"	"	"	"



CATARACTS

Prevention

Annual dilated fundoscopy (except for first five years in insulin-dependent patients).

More frequent if pre-proliferative changes.

Annual visual acuity, with glasses or pinhole.

Good control (before visible damage).

Treat hypertension.

Stop smoking.

Treatment

Photocoagulation - xenon arc
- argon laser

May improve vision in maculopathy.
Slows progression with new vessels, especially on disc.

Drops

Use tropicamide for dilatation (0.5%, 1%)

Short acting.

Does not need reversal.

DIABETES - HOME MONITORING OF CONTROL

AIMS Assessment of overall long term "control". Early warning of hypo and hyperglycaemia.

METHODS

URINE TESTING

Indirect measuring of blood glucose (BG)

ADVANTAGES Cheap, simple (especially diastix). O.K. when tight control not needed as in most cases of N.I.D.D.

LIMITATIONS

Messy, retrospective, not possible to diagnose hyp glycaemia with it, loose "relationship" with blood glucose

METHODS

Diastix (almost glucospecific) simple and quicker than clinitest.

Clinistix not much value in diabetes monitoring.

USES O.K. in N.I.D.D. Complements blood glucose in I.D.D. Identifies hyperglycaemia.

BLOOD TESTING

Advantages

Can warn of impending hypoglycaemia , almost whole range of blood glucose covered. Reflects instantaneous BG.

Disadvantages

Expensive, not on drug tariff (£5 +) Good technique essential, including clean fingertips! Finger pricks disliked by some patients.

METHODS

BM - TEST GLYCEMIE 20 - 800 strips (BCL)

Two-part reagent pad (high and low range)

No water needed, long shelf-life, accurate up to 12mmol/L

Not so good higher. Colour stable when once developed.

Problems

If patient has poor colour vision, if insufficient time allowed, smeared blood. (Visidex - Ames similar but different colours).

Dextrostix

Many disadvantages - has been superceded by BM TEST except for use in reflectance meter.

Reflextance Meter

Uses reagent sticks. Necessary only when tight control needed (pregnancy) or poor vision which means that the BM test cannot be used. Costing $\geq$ £70.

TYPES

Glucometer or Hypocount (uses Dextrostix) Both good.

Uses Mainly for I.D.D. giving warning of hyper or hypoglycaemia. Some indication of long term control. Fasting BG done by the doctor usually sufficient in N.I.D.D.

When to test

1. Spot tests x 2 daily on 2 or 3 days a week.
2. 24 hour profile very helpful in adjusting insulin/diet regime.
   times - before each meal (3)
   2-3 hours after meal (3)
   ? at 3 a.m. (1)
3. If hypoglycaemia suspected.
4. Before driving, unless postprandial.

The aim is to keep BG 4-7 mmol/L, less strictly in the elderly when less than 13 mmol/L may be O.K. as long as enough to avoid diabetic symptoms. Avoid wide swings of glucose control.

DIABETES IN THE SURGERY

Diagnose if
- Fasting blood sugar > 8mmol/L
- 2 hours after a glucose load > 10mmol/L

Refer
- Newly diagnosed diabetics under 30 year
- Glycosuria with Ketonuria
- Underweight unwell patients
- Pregnant diabetics
- Those whose diabetes is difficult to control

Advantages of mini-clinic
- Simpler to organise practice facilities
- Easier for dietitian to be present
- One doctor in group gets extra expertise
- Patients may get support from each other

Disadvantages of mini-clinic
- May not be enough diabetics in the practice
- Too much concentration on the patients' diabetes
- Other doctors in group lose their diabetic expertise
- Alien to concept of 'General Practice'

Prevalence of Diabetes
- The average GP should have 20-25 diabetic patients of which 75% are N.I.D diabetics.
- He will diagnose 2-4 new cases of diabetes a year.

- Worse than previous visit
✓ Same as previous visit

DIABETES MELLITUS

Date									
Symptoms Well being									
Eyesight									
Polyuria and nocturia									
Exercise chest pain									
Neuropathy									
Signs Weight									
BP									
Fundi									
Visual acuity									
Foot pulses / pin prick									
Investigations urine glucose									
urine protein									
blood glucose									
blood urea									
Treatment Drugs									
Date of next hospital attendance									
Comments:									

Smoky

PROGRAMME

1.30 p.m.	Registration
Chairman	Dr. John Yudkin
2.00 - 2.20 p.m.	Problems of Diabetic Care in the Community - One Approach to a Solution
	Dr. Brian Hurwitz Diabetic Research Fellow Whittington Hospital London, N19
2.20 - 2.45 p.m.	Seeing Diabetic Patients In Mini-Clinic or General Surgery Time?
	Dr. Sue Tasker Goodinge Health Centre Islington, London N7
	Dr. Mike Modell Director, General Practice University College Hospital London, WC1
2.45 - 3.30 p.m.	Group Discussion Including Experience of Community Dietitian, G.P. Practice Nurse, Diabetic Specialist Nurse
3.30 - 4.00 p.m.	TEA

PROGRAMME

4.00 - 4.20 p.m.	How Can We Evaluate Shared Care?
	Mr. Mike Porter Dept. General Practice Edinburgh
4.20 - 4.40 p.m.	Shared Care and Specialist Care V. General Practice
	Professor Eric Wilkes Emeritus Professor General Practice Sheffield
4.40 - 5.00 p.m.	What's the Role of the Local Diabetic Clinic in Shared Care?
	Dr. Edwin Gale Consultant Diabetologist St. Bartholomew's Hospital London EC1
5.00 - 6.00 p.m.	OPEN DISCUSSION

SYMPOSIUM ON DIABETES

I wish to attend the meeting on Thursday, 22nd November, 1984

Name (Block Letters)

.....

Address (Block Letters)

.....

.....

.....

....

Family Practitioner Committee

.....

.....

Signature

.....

Appendix 2: Islington Personal Diabetic Record Card.

See pocket inside back cover.

Appendix 3: Islington Personal Diabetic Record Card Leaflet.

Leaflet (Hurwitz and Richardson 1987) which explains in detail how to use the Islington Diabetes Personal Record Card.
Reproduced with the permission of the publishers.

The Islington Personal Diabetic Record Card

This diabetic record card has been developed at the Whittington Hospital Diabetic Clinic for use in the Islington Shared Care Scheme. It was designed by Dr Brian Hurwitz in association with a local working party of general practitioners & practice nurses. The card has sixteen pages, and is designed to last ten years.

The card fits neatly inside the Lloyd George Folder. It has a brown stripe at the top - the RCGP colour-code for diabetes - which just shows above the outer wallet. It can be given to the patient or sent by post if referral to a hospital clinic is indicated. Some GPs have elected to use the card as a patient-held medical record, in which case it fits snugly into a polythene card holder (8x5ins) for protection & safekeeping.

The card is divided into three basic sections:

SECTION I: INITIAL ASSESSMENT

PAGES 2 & 3 cover the initial diagnostic biochemistry, and the history of the condition.

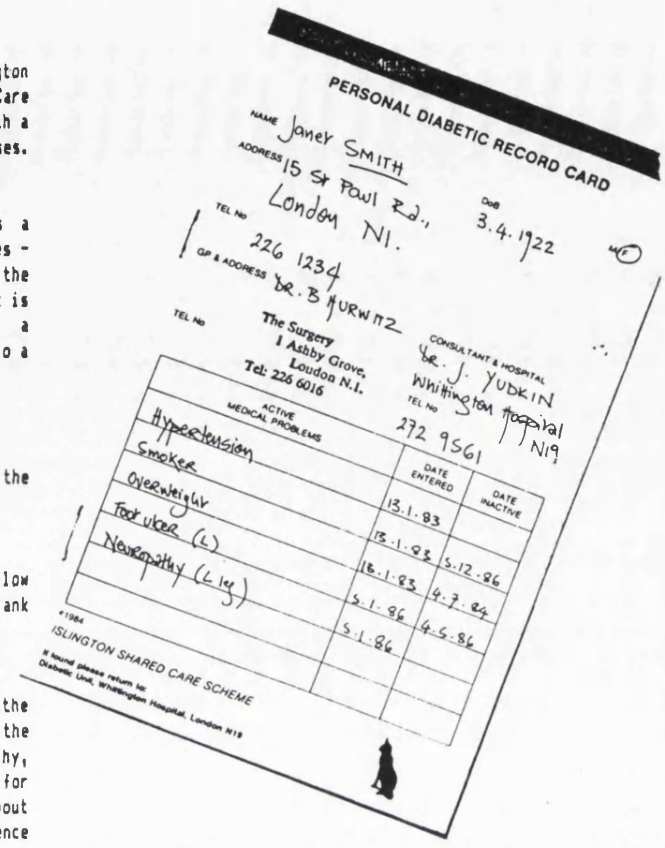
SECTION II: FOLLOW-UP

The CENTRE PAGES 4-11 consist of follow-up columns which allow for regular review. The GP can elect to leave some columns blank depending upon the focus of concern.

SECTION III: ANNUAL REVIEW

PAGES 12-16 cover ten possible annual reviews, focussing on the development of symptoms & complications. Each section prompts the examination of the lower limbs for evidence of neuropathy, ischaemia and general foot health. Space is also provided for recording visual acuity, and - for GPs who feel confident about ophthalmoscopy through dilated pupils - the presence or absence of retinopathy.

The author recommends that GPs adopting the card should always enter in the general notes some indication that a diabetic consultation has occurred. His own practise is to rubber stamp 'DIABETIC REVIEW - WEIGHT/URINE/BLOOD GLUCOSE' beside the date in the general notes. This ensures that if the patient consults for other reasons, the diabetic record is not neglected.



The following medical history is that of a real diabetic patient. Her diagnosis was made in general practice and followed up using the Diabetic Shared Care Card.
Her history illustrates the card's value in several important aspects of diabetic monitoring:

- **the initial management plan**
- **routine monitoring of glycaemic control**
- **diabetic education & advice**
- **parallel treatment of other medical conditions**
- **the evolution, treatment & resolution of diabetic complications**
- **the promotion of anticipatory care by annual clinical reviews**
- **the appropriate referral of diabetic patients**

FIRST EXAMINATION

At the time of diagnosis of diabetes, Mrs Janet Smith was 60 years old. Her initial random plasma glucose had been 22 mmol/L but by the time she returned for her first diabetic review, this had fallen to 17 mmol/L - probably the result of simple advice to avoid sweet foods. Her weight was 40% above ideal body weight, and her urine was clear apart from glycosuria. Blood pressure was adequately controlled on treatment. Visual acuity was poor in both eyes, but corrected well with a pin hole. Fundoscopy was deferred that day because she was driving. There was no evidence of peripheral ischaemia or neuropathy in her legs and feet.

2

DIABETIC HISTORY

DATE OF DIAGNOSIS: Jan '83 DATE ENTERED SCHEME: Jan '83

DIAGNOSTIC RESULTS:

RBS ....22....... mmol/L (≥11 plasma glucose)

+/or

FBS .... mmol/L (≥8 plasma glucose)

+/or

75G OGTT 2HR glucose .... mmol/L (≥11)

Creat or Urea at Diagnosis ....80....... (≤120 μmol/L or ≤5.5 mmol/L)

SYMPTOMS AT ONSET: Lethargy; Pruritis vulvae

CURRENT DRUG THERAPY: Atenolol 100 mg om; Bendrofluazide 5mg om FH Mother - Type II

SOCIAL HISTORY: Married. 3 children. Works as home help. No hist. of heavy babies.

SMOKING: 10/d 20 years ALCOHOL: 2-3 units per week

FIRST EXAMINATION 13.1.83

BLOOD SUGAR 17 mmol/L

WEIGHT 74 kg HEIGHT 1.63 m (5ft 4) IDEAL BODY WEIGHT 56 kg

URINE GLUCOSE ++ KETONES –

PROTEIN – BLOOD –

BP LYING 160/88 mmHg STANDING 160/90

PULSE 70 CVS

RS Clear AS Soft

INITIAL MANAGEMENT PLAN

Mrs Smith was referred to a dietitian for a weight reducing and diabetic diet. She was also advised to have her eyes tested by a local optometrist. Urine testing with diastix was demonstrated and she was given a British Diabetic Association *'I am a Diabetic'* Card. Clotrimazole was prescribed for her pruritis, though this usually remits as the gylcosuria decreases. Finally, an MSU was checked.

Follow-up in the 1st Year

The results of the initial examination are entered in the first follow-up row on the card to provide a baseline. At each subsequent diabetic review, blood glucose is checked with a BM stix meter (Reflolux). The blood glucose column, read downwards, reveals that blood glucose falls slowly but steadily in the first six months after diagnosis. By Sept 1983, even after her weight has fallen by 10Kg, Mrs Smith's blood sugar is still quite high at 11 mmol/L. Although she is still 20% above ideal body weight at this stage, the decision is taken to stop her bendrofluazide in view of its hyperglycaemic effects and her well-controlled blood pressure. By January 1984, one year after diagnosis, she has lost over 13Kg, her blood sugar is adequate at 6.2 mmol/L 1 hour post-prandially, and her HbA1 is almost in the normal range. Mrs Smith now tests her urine in the mornings only.

See over for 1st Annual Review

4

DATE	WT	URINE GLU	URINE KET	URINE ALB	Blood Glucose	Time After Last Meal	BM Stix Meter	PATIENT TEST URINE/BLOOD
13.1.83	74	1%	–	–	17	2 hrs	M	Taught urine tests
16.2.83	73½	1%	-	-	15.4	–	M	Tests urine bd
14.5.83	71	½%	-	-	12.2	1½ hrs	M	–
20.6.83	68	½%	-	-	11.4	2 hrs	-	To test am only
14.9.83	64	½%	-	-	11.0	1½ hrs	-	–
7.1.84	60.5	–	-	-	6.2	1 hr	-	–
4.7.84	60	–	–	–	6.4	½ hr	-	to test twice weekly
11.1.85	61	–	–	-	6.5	½ hr	-	–
5.6.85	62	–	–	+	7.6	1 hr	-	-
7.9.85	62	–	–	–	7.4	–	–	–
5.1.86	64	1%	-	-	12	–	–	To test om
4.3.86	65	1%	-	-	14	-	-	-
4.5.86	61	-	-	-	7.4	½ hr	-	To test twice weekly
5.12.86	62.5	-	-	-	7.0	1 hr	•	-

2nd Year Follow-up

The vertical columns recording follow-up from Jan 1984 to Jan 1985 indicate that Mrs Smith's weight and glycaemic control are both stable and adequate throughout this period. Only twice weekly urine tests are checked at home, one on a week day and one on a week-end day. Since stopping bendrofluazide, Mrs Smith's diastolic BP has risen a little. By Jan 1985 it is 94mmHg.

See over for 2nd Annual Review.

3rd Year Follow-up

In 1985 Mrs Smith's diastolic blood pressure has reached 100mmHg and she has Alb+ in her urine. The possibility of early nephropathy with hypertension arises. But an MSU indicates a UTI which is treated promptly. Subsequent urine tests are free of albumin. By June, it's clear that the GP is unhappy about the level of Mrs Smith's diastolic blood pressure. Since she is already on a maximal dose of atenolol, and the GP wishes to avoid re-introducing a diuretic, Nifedipine is prescribed. Subsequent blood pressure readings are satisfactory.

See over for 3rd Annual Review.

4th Year Follo

Mrs Smith's blood gluc
has also increased. Metf
her weight and blood g
at the 3rd annual review
suggesting good overall

See over for 4

3

INITIAL EXAMINATION (cont'd)

	R	L
...TY	6/18	6/18
no glosses / ...RECTED ACUITY / ...LASSES/PIN HOLE	6/6	6/5
...OI	Normal	Normal
...LS DILATED	YES/NO	YES/NO

Dilate next time ✓

...DITION OF FEET: Good. No pressure points. No athletes' foot.

...SES	R	L	REFLEXES	R	L	SENS^N	R	L
...B	✓	✓	KNEE	✓	✓	PIN PRICK		
...ED	✓	✓	ANKLE	✓	✓	VIB^N		

INITIAL MANAGEMENT PLAN

1. see dietitian (letter given) ✓ Diabetic + weight reducing diet
2. see optometrist ? refractive error ? needs glasses
3. Taught urine testing

Rx Clotrimazole cream & pessaries

✓ check MSU

APPOINTMENT

1/12 given diabetic card

The CENTRE PAGES 4-11 consist of follow-up columns which allow for regular review. The GP can elect to leave some columns blank depending upon the focus of concern. As the pages are turned from 5-6, and from 9-10 the date is maintained on the left, so that there is a continuum across four pages for each follow-up visit.

5

FEET R	FEET L	VISUAL ACUITY R	VISUAL ACUITY L	GP INITIALS H=HOSPITAL
Good	Good	6/6	6/5	BH
		{fundi normal {eyes dilated		BH
				BH
				BH
				BH
Good	Good	6/6	6/6	BH
				BH
Good	Good	6/6	6/6	BH
				BH
				BH
Good	Finished our ulcer	6/6	6/6	BH
	ulcer clean			BH
"	healed!			BH
Good	Good	6/18	6/6	BH

4 / 6

DATE	OTHER ACTIVE CONDITION(S)	TREATMENT PLAN	COMMENTS	% HbA_1 N≤8.5
13.1.83	Hypertension Overweight	Diet alone	Almost 20 kg above ideal body weight. see 1/12	
16.2.83	"	Continue with diet	see 1/12	
19.5.83	"	"	Lost 3 kg in 3 months. see 3/12	
20.6.83	"	to see dietitian again	Weight ↓ slowly. see 3/12	
14.9.83	"	Stop Bendrofluazide	Weight now less than 120% IBW. Control still poor. see 3/12	13%
.1.84	Hypertension	Diet + Atenolol 100mg om	See Annual Review. Well. see 6/12	
.7.84	"	"	Well. Watch BP. See 6/12	9.2%
.1.85	"	"	See Annual Review. Well, but BP↑. see 3/12	
.86	-	Start Nifedipine 10mg tds	Albuminuria + check MSU → E.Coli. Treat BP.	8.8%
.86	"	no change	BP ok. Urine clear. see for Annual Review 4/12	
86	Neuropathy	District nurse weekly dressings	see Annual Review. 1/4 in ulcer L. foot. Absent AJ. see 2/12	
86	"	Start Metformin 500mg bd.	Weight↑ See 2/12	
	Hypertension Neuropathy		No hypos. Good control. Weight ↓ see 6/12	
	"	Refer ophthalmologist ?maculopathy	see Annual Review. Exudates at R macula. Loss VA. see 3/12	8.9%

...p

...is 14 mmol/L in March 1986, and her weight ...n is commenced in March, and by May both ...e have decreased. Her foot ulcer, noticed ...s fully healed by May. Her HbA1 is low ...emic control.

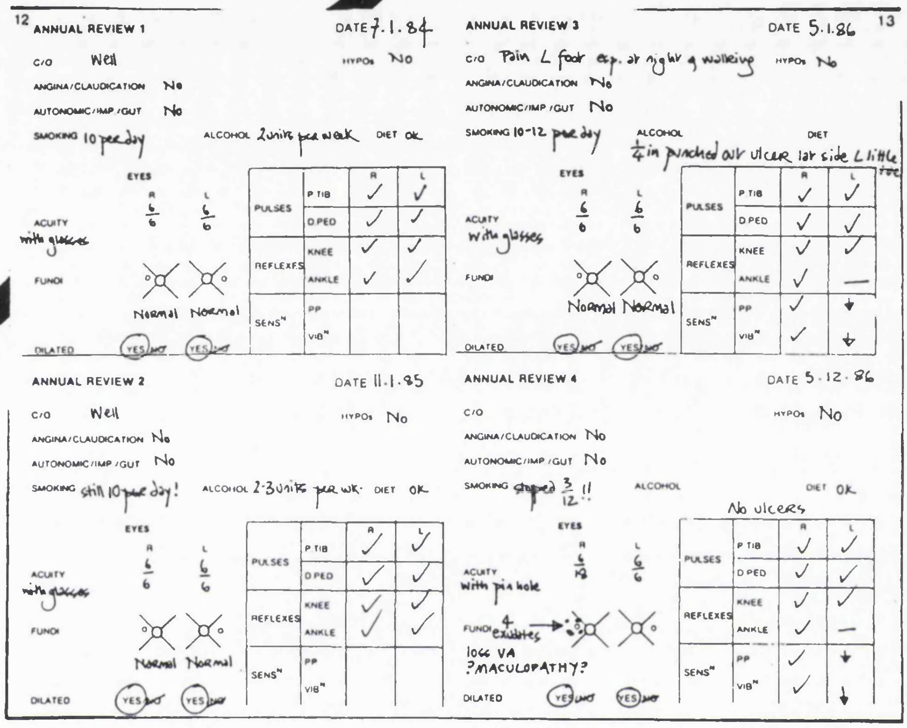
Annual Review.

1st Annual Review

The first annual review examination in January 1984 does not reveal any significant symptoms. There are no signs of neuropathy or ischaemia on simple testing. (Note it is not this GP's practice to test for pin-prick or vibration sensation in the presence of preserved reflexes.) Her visual acuity is normal - since her first examination Mrs Smith has been fitted with distance glasses. After dilatation of her pupils with 0.5% tropicamide, her fundi appear normal.

2nd Annual Review

This review shows no clinical change from the one a year earlier.



12 ANNUAL REVIEW 1 DATE 7.1.84
C/O Well HYPOs No
ANGINA/CLAUDICATION No
AUTONOMIC/IMP/GUT No
SMOKING 10 per day ALCOHOL 2 units per week DIET ok
EYES R L
ACUITY with glasses 6/6 6/6
FUNDI Normal Normal
DILATED YES/NO YES/NO

		R	L
PULSES	P TIB	✓	✓
	D PED	✓	✓
REFLEXES	KNEE	✓	✓
	ANKLE	✓	✓
SENS[N]	PP		
	VIB[N]		

ANNUAL REVIEW 2 DATE 11.1.85
C/O Well HYPOs No
ANGINA/CLAUDICATION No
AUTONOMIC/IMP/GUT No
SMOKING still 10 per day! ALCOHOL 2-3 units per wk. DIET OK
EYES R L
ACUITY with glasses 6/6 6/6
FUNDI Normal Normal
DILATED YES/NO YES/NO

		R	L
PULSES	P TIB	✓	✓
	D PED	✓	✓
REFLEXES	KNEE	✓	✓
	ANKLE	✓	✓
SENS[N]	PP		
	VIB[N]		

ANNUAL REVIEW 3 DATE 5.1.86 13
C/O Pain L foot esp. at night & walking HYPOs No
ANGINA/CLAUDICATION No
AUTONOMIC/IMP/GUT No
SMOKING 10-12 per day ALCOHOL DIET
¼ in punched out ulcer lat side L little toe
EYES R L
ACUITY with glasses 6/6 6/6
FUNDI Normal Normal
DILATED YES/NO YES/NO

		R	L
PULSES	P TIB	✓	✓
	D PED	✓	✓
REFLEXES	KNEE	✓	✓
	ANKLE	✓	—
SENS[N]	PP	✓	↓
	VIB[N]	✓	↓

ANNUAL REVIEW 4 DATE 5.12.86
C/O HYPOs No
ANGINA/CLAUDICATION No
AUTONOMIC/IMP/GUT No
SMOKING stopped 3/12 !! ALCOHOL DIET OK
No ulcers
EYES R L
ACUITY with pin hole 6/18 6/6
FUNDI 4 exudates →
loss VA ?MACULOPATHY?
DILATED YES/NO YES/NO

		R	L
PULSES	P TIB	✓	✓
	D PED	✓	✓
REFLEXES	KNEE	✓	✓
	ANKLE	✓	—
SENS[N]	PP	✓	↓
	VIB[N]	✓	↓

PLEASE NOTE:
'Autonomic/Imp./Gut' refers to symptoms of autonomic neuropathy with particular reference to impotence, diarrhoea and sweating.

3rd Annual Review

At her annual review in January 1986 Mrs Smith is complaining of pain in her L foot especially at night and when walking. Examination reveals a small punched out ulcer on the lateral aspect of her little toe. She has evidence of neuropathy with an absent L ankle jerk and diminished pin-prick and vibration sensation. The patient is referred to the district nurses for weekly dressings of her ulcer.

4th Annual Review

Mrs Smith's latest annual review was in Dec 1986 when it was noted that she had given up smoking for the last 3 months. The previously recorded signs of neuropathy in her L leg persist but, in addition, she has lost 3 lines of visual acuity in her R eye and acuity is not corrected by a pin-hole. Dilated fundoscopy reveals four small exudates around the macula. She is therefore referred to a consultant ophthalmologist for an opinion.

Appendix 4: Descriptive characteristics of diabetic mini-clinic practices 1984-87.

Descriptive characteristics of general practices which set up diabetic mini-clinics in the catchment of the Whittington Hospital between 1984-87.

Appendix 4:

Descriptive characteristics of diabetic mini-clinics in the Whittington catchment 1984-87.

Seven practices, consisting of 35 GP lists, set up their own diabetic mini-clinics over a 3 year period (1984-87). Table A.1 shows some of the key characteristics of these practices. Note that only 3 of the mini-clinic practices were geographically within Islington; the remaining 4 practices were sited on the boundaries of Islington but had strong links with the Whittington Hospital.

TABLE A.1: Characteristics of general practices which set up mini-clinics 1984-1987 as a result of the Islington Community Care Initiative

Type of premises	Size of GP partnership	Whole time equivalent nurses	No. GP trainees	No. registered diabetics April 1987
+Doctor owned (Cost rent)	8	1.5 employed	2	119
+Health Centre	7	1 employed	2	124
+Health Centre	6	1 employed	2	125
+Doctor owned (Cost rent)	5	1.5 employed	1	65
*Health Centre	4	1.5 employed	1	84
*Health Centre	3	1 attached	0	70
*Local Authority rented	2	0	0	45

+ Geographically outside Islington but within diabetic catchment of the Whittington Hospital.
* Geographically within Islington borders
Note, the 7 doctor practice set up a "diabetic day" rather than a mini clinic (Koperski 1987).

Tables A.2 and A.3 are taken from the Report of the General Practice

Facilitator for Islington (Elliott 1983). They show comparative characteristics for Islington general practices at the time the diabetic mini-clinic initiative was started. It can be seen that those practices which succeeded in setting up mini-clinics were by no means representative of Islington practices as a whole, in terms of the size of GP partnership, or in the type of premises which they occupied. It can be seen that mini-clinic practices had much more nursing help than the average practice: in 1985, the earliest date for which figures are available, there were only 0.14 whole time equivalent *employed* practice nurses per partnership in the Camden & Islington Family Practitioner area (Pickard 1992). This compared, at that time, to the national average of 0.25 employed practice nurses per partnership. Excluding mini-clinic practices with *attached* practice nurses (who were employed not by the GPs but by the district health authority which then attached the nurses to general practices located in health centres) the average number of employed practice nurses per mini-clinic practice averaged 1, some 7 times the average for the locality at that time.

TABLE A.2: Grouping of Islington GPs (%)

	No. of Doctors	%
Single handed	22	(25)
2 partners	16	(18)
3 partners	33	(38)
4 partners	16	(18)
	= = =	
TOTAL	87	

TABLE A.3: Ownership of Practice Premises in 45 Practices (%) in Islington

Doctor	14 (31)
London Borough of Islington	9 (20)
Health Authorities (Health Centres)	8 (18)
Private	7 (16)
Greater London Council	4 (9)
Former Partners	3 (7)

Table A.4 gives a breakdown of the number and treatment of diabetic

patients who had received structured review of diabetes in a mini-clinic setting by the Spring of 1987. By that time, 34% of diabetic patients registered with these practices had been reviewed in a mini-clinic.

The variable proportion of diabetic patients who had received structured clinical review in these settings by the time of the audit resulted from several factors: these included the differing duration of operation of mini-clinics, varying policies concerning which diabetics the practices invited to attend for mini-clinic review, the differing frequency with which the mini-clinics were held, and differing patient compliance.

Total prevalence of diabetes in these practices was calculated by combining the lists of diabetics compiled within each practice with those compiled at the Whittington and Royal Northern Hospital diabetic clinics (referred to in Section II).

TABLE A.4: Diabetic patients reviewed in 7 practices by Spring 1987

Practice	Total No. diabetics registered	Patients reviewed by GP in mini-clinic setting once or more					% seen in a mini-clinic
		Diet alone	Tablets	Insulin	Not known	Total	
1	119	11	13	2	4	30	25%
2	124	15	35	12	3	65	52%
3	125	13	30	7	-	50	40%
4	65	7	7	2	4	20	30%
5	84	11	10	2	1	24	28%
6	70	1	3	0	1	5	7%
7	45	5	10	5	-	20	44%
Totals	632	63	108	30	13	214	34%

Total list size ~ 62,000
Prevalence ~ 1%

Appendix 5: Standard letters for prompting & referral.

Standard letters sent out by the prompting database:

GP cycle

Letters to patients:
- to attend a centre for blood and urine tests
- enclosing results of above on GP review form

Memo to arrange hospital clinic appointment in event of referral

Letter to arrange dietary advice in event of referral

Letter to GP informing of non response by patient.

Eye cycle

Letters to patients:
- to attend optometrist annually for dilated fundoscopy (+map)
- reminder letter in event non response

Referral letter to ophthalmologist in event of referral by optometrist

Letter informing GP of patient referral to ophthalmology outpatients.

ISLINGTON
HEALTH AUTHORITY

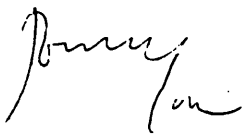
COMMUNITY CARE OF DIABETES

You are now due for a blood and urine test. I enclose test forms and a small urine bottle to be taken to one of the centres *listed overleaf.* Choose the place which is most convenient for you.

Please make sure that you get these tests done within the next 7 days and that you follow the instructions for producing the urine sample carefully.

I will send the results of these tests back to you to take to your general practitioner when you attend the surgery for review of your diabetes.

Yours sincerely,



Dr John S Yudkin
Consultant Physician in Charge
Diabetic Clinic

Please Note: You may attend your GP's surgery for these tests at the following times:-

Dr Helen Ezra TIME: 9.00am - 11.0am
46 Queens Avenue Monday to Friday
London N10

Whittington Hospital
Archway Wing, Highgate Hill, London N19 5NF
Telephone 01-272 3070 Fax 01-272 6819 Telecom Gold 75: NHS 1810/1811

PLEASE TURN OVER

Whittington Hospital
Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

ROYAL NORTHERN HOSPITAL
HOLLOWAY ROAD, LONDON N7 6I

REMINDER

Dear

RE: COMMUNITY DIABETIC CARE.

Following your recent blood test, I sent you a form to take to your GP for diabetic review. Our records show that you have not yet seen your GP for this important check up.

Please arrange to see your GP as soon as possible. Don't forget to take the medical record form sent to you previously.

Yours sincerely,

DR John S Yudkin.

Consultant Physician in charge
Diabetic Clinic.

Whittington Hospital

Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

ROYAL NORTHERN HOSPITAL
HOLLOWAY ROAD, LONDON N7 6LI

Dear

COMMUNITY CARE OF DIABETES

The results of your recent blood and urine tests are shown on the enclosed medical record.

Please arrange to see your GP in the next 10 days for a diabetic check up. If your GP has an appointment system please make a double appointment. Your GP will need to know the results of these tests so **please take the enclosed record with you when you attend.**

Yours sincerely

Dr J S Yudkin
Consultant Physician in Charge
Diabetic Clinic

Enc

Whittington Hospital

Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

Dear

COMMUNITY CARE OF DIABETES

The results of your recent blood and urine tests are shown on the enclosed medical record and it appears that you may have a slight urinary infection.

Please arrange to see your GP in the next **3** days for a diabetic check up. If your GP has an appointment system please make a double appointment. Your GP will need to know the results of these tests so **please take the enclosed record with you when you attend.**

Yours sincerely,

Dr John S Yudkin MD FRCP
Consultant/Senior Lecturer in
General Medicine and Diabetes

ENC:

Whittington Hospital

Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

Dear

COMMUNITY DIABETIC CARE

RE: Name:

Address:

This is just a note to let you know that your patient named above has not yet responded to prompts for RBS and HbA_1, and therefore has missed clinical diabetic review.

As you know this patient is in prompted community diabetic care which entirely depends upon the patient responding to prompts and reminders.

I would be grateful if you would inform us as soon as possible of any new circumstances which might make community diabetic care inappropriate, or whether the patient has moved address.

If we do not hear to the contrary, the patient will be prompted again in 6 months as usual.

Yours sincerely,

Dr John S Yudkin
Consultant in Charge
Diabetic Clinic

MEMO

TO: Pat Bartley Jackie Briskman
Diabetic Office

FROM: Community Diabetic Care

DATE:

RE: COMMUNITY DIABETIC CARE

Please make an appointment for the patient named below to attend the Whittington or Royal Northern Diabetic Clinic in the first possible space.

Please notify both the patient and Community Diabetic Care of the appointment date and time.

_____

_____

_____

_____

_____

_____

_____

Whittington Hospital

Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

Nutrition and Dietetics Department
Whittington Hospital
St Mary's Wing

Dear Dietitian,

COMMUNITY DIABETIC CARE

RE:

This non-insulin treated diabetic patient needs dietary advice. Please send the patient an appointment.

The patient has had diabetes for ..... and has the following complications.....

Please write to the GP when the patient has attended.

Yours faithfully,

Dr John S Yudkin
Consultant Physician in Charge
Diabetic Clinic

C:\WP5\CAROLINE\DIET-PAT.WSE

Whittington Hospital
Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

ROYAL NORTHERN HOSPITAL
HOLLOWAY ROAD, LONDON N7 6LI

Dear

Community Care of Diabetes

You are now due for an annual eye test. I enclose a list of local optometrists who will test your eyesight and check the back of your eyes for early signs of diabetic eye disease. You may attend whichever optometrist is most convenient for you and there will be no charge. Please make an appointment either by phone or in person as soon as possible.

I enclose a special optical record which you should take to the optometrist when you attend for the eye test. If there are any important abnormalities found you will be referred for a specialist examination at the hospital.

Your sincerely,

Dr John S Yudkin
Consultant Physician in Charge
Diabetic Clinic

ENC:

Whittington Hospital
Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

ROYAL NORTHERN HOSPITAL
HOLLOWAY ROAD, LONDON N7 6I

Dear

RE: COMMUNITY DIABETIC CARE.

I recently sent you a form to take to an Optometrist when you attend to have an eye test.
A copy of this form has not yet been returned to us. If this is because you have not yet attended for eye review, please make an appointment within the next two weeks. I enclose a list of local Optometrists who will test your eyesight and check the back of your eyes for early signs of diabetic eye disease. Please attend an Optometrist only from the enclosed list.
This test is free.
I enclose a copy of the original form to take to the Optometrist when you attend. If there are any important abnormalities found you will be referred for a specialist examination at the hospital.
If you have already seen an Optometrist recently for diabetic eye review, please write down the Optometrist's name and address in the space below and return this letter to me in the enclosed stamped addressed envelope.

Yours sincerely,

Dr John S Yudkin.
Consultant Physician in charge
Diabetic Clinic.

ENC:

COMMUNITY DIABETIC CARE

Yes I have seen a local Optometrist for a diabetic eye check.

Optometrist's Name:_____

Address:_____

Date of eye test (if known)_____

Whittington Hospital

Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

Miss Claire Davey
Consultant Ophthalmologist
Whittington Hospital
St Mary's Wing

Dear Claire,

RE:

This non-insulin treated diabetic patient has been assessed by an optometrist participating in Community Diabetic Care, and has been referred for review in ophthalmology outpatients. Please send the patient an appointment.

The patient has had diabetes for ..... and has the following complications.....

and is on the following drugs .....

I enclose a copy of the optometrist's findings.

Please reply to Community Diabetic Care, c/o Dr John Yudkin, Diabetic Office, Archway Wing and send copies to the optometrist and GP.

Yours sincerely

Dr John S Yudkin
Consultant Physician in Charge Diabetic Clinic

ENC:

Whittington Hospital
Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

ROYAL NORTHERN HOSPITAL
HOLLOWAY ROAD, LONDON N7 6LI

Dear Dr

Re: Community Diabetic Care

Your diabetic patient: _____

_____

_____

_____

has been referred by an optometrist for ophthalmic review.

An appointment in Ophthalmology outpatients has been requested and you will receive a full report in due course.

Yours sincerely,

Dr John S Yudkin
Consultant Physician in Charge
Diabetic Clinic

Appendix 6: Prompting system protocol.

Set of rules governing the order and frequency of prompting cycles together with override conditions.

COMMUNITY DIABETIC CARE

Protocol for Prompting System

Prompt for tests

- Check outcome of clinic appointments

- Complete test forms for:
  (1) Chemistry [RBS (creat)]
  (2) Endocrine (HbA_1)
  (3) Microbiol (MSU & Protein)

- Make sure all test forms are stamped CDC and that Microbiol form top & bottom copy are stamped CDC and 'Please Test for Protein'.

- Endocrine form add 'Please collect in sequestrene bottle'.

- Check which patients need a creatinine test: ie. if complications include the following:- proteinuria, intermittent proteinuria, or nephropathy.

- Prompt patients due for tests - send each patient:
  letter
  list of centres
  MSU instructions
  3 completed test forms
  labelled urine bottle.

GPs who do their own blood taking - their patients get special letter.

Enter date on patient record card and add patient name to summary card.

- Collect test results from Brian Hurwitz basket - check this daily.

- Check all test results as they come in and date stamp.

If RBS ≥ 20 < 25 prompt patient to see GP a.s.a.p. - 3 days letter.
If RBS ≥ 25 - make urgent clinic appointment through Pat, Diabetic Office; notify patient and put a note to clinic doctor in patient hospital notes prior to clinic appointment explaining reason for appointment. Do *not* prompt patient to GP.

- Check HbA_1 and MSU results.

- Collect results for each patient and phone labs for missing results.
If missing results ask lab to send a copy of missing result for attention of Dr Hurwitz, Diabetic Office.

- **If test results not done at all** ie "mishap" in the lab to both HbA and RBS then send a repeat lab test prompt to patient.
If only mishap to HbA_1, ignore and continue cycle.
Place not tested (NT) in HbA_1 column on review form. (NT = not tested)

- **If test results do not come in after 3 weeks** send each patient:
reminder letter
3 further test forms
urine bottle.
make note in record card

- **If test results still do not arrive, after a further 3 weeks** send 2nd reminder letter.
2nd reminder for tests is a different letter (no test forms or urine bottle this time).

If no results after 2nd reminder after 3 weeks send letter to GP informing of non-response and asking for information.
If tests not done, then patient prompted again in 6 months from date first prompted for tests.

- *When all results are in:*

Prompt for GP Clinical Review

- Make out Annual or Regular GP Clinical Review Form as appropriate.

- Find last review form and check for more recent form in data entry backlog - in order to update treatment and complications.

On GP Clinical Review Form:

Add up-to-date test results
work out mean
update review number
update annual review date
update complications and treatment where necessary
update last retinal screening date where appropriate
If creatinine test done add normal creatinine range at bottom of form under "notes for GP"

- Send review form to patient with reply paid envelope (staple this to back of review form) and accompanying letter asking patient to attend GP for diabetic check up.

- Enter date and fact of review form sent, on patient record card and tick summary card.

- **When completed GP Review Form is returned:**

date stamp
check information is complete
check for any referrals
Note date of review in patient record card and note on summary card.

- **If referral to dietician or chiropodist requested,** send letter (having added patient and GP details) to dietician/chiropodist requesting an appointment be sent to patient.

- **If clinic appointment requested:**

do memo to Pat, Diabetic Office adding patient details, asking her to make early clinic appointment, with one of the Senior doctors.

Patient must be notified of appointment .

Prior to patients appointment put copy of GP Review Form, and any letter from GP and place in hospital notes together with "sticky" note to Clinic doctor.

Note date of clinic appointment in patient record card (prompting system).

- **If GP Review Form not received back after 2 weeks,** phone GP to check whether patient has attended or not.

- *If yes* - request copy of form is returned for our records in reply-paid envelope.

- *If no* - ie patient has not attended, send reminder letter to patient to attend GP.

- **If no GP Review Form returned after reminder,** then patient should be prompted to get tests done again in 6 months after first prompted for tests.

- *After GP Review Form received and any referrals made:*

Prompt for optometry Review

If patient due for annual eye check, prompt patient to attend optometrist.

- Make out optometrist review form. Find last optometrist review form and check for most recent form in data backlog and add previous review findings, update review number.

- Also check most recent GP Review for any changes in treatment eg: from diet to hypoglycaemics.

- Send to patient with accompanying letter asking them to have diabetic eye check together with list and map of optometrists, and reply paid envelope (staple this to review form)

- Check if optometrist or GP has requested an eye check sooner than one year.

NB - If patient does not get tests done OR if patient does not attend GP for review, patient should still be prompted for eye check if due.

- Note prompt to optometrist on patient record card and summary card.

- If no optometrist review form returned after 3 weeks send reminder to patient - special letter with reply slip on bottom and repeat optometrist review form and reply paid envelope.

- When copy optometrist review form returned, **if referral to ophthalmologist requested** send referral letter to ophthalmology Dept and send letter to GP informing of this referral.

- Note on patient record card and summary card.

- After receiving copy of optometrist review form - photocopy form and send it to patient's GP with explanatory compliments slip (drawer marked retinal screening results).
- Note date copy sent to GP on Optometrist Review Form.

NB If patient is under hospital eye clinic, then do *not* prompt patient to attend optometrist. Such patients continue with hospital eye clinic care.

In general it helps to keep a stock of:

a) test forms ready stamped up
b) standard letters
c) Optometrist maps and lists
d) pre-paid envelopes stamped

NB If person running prompting system is absent (eg annual leave, sick leave) suitable cover for system needs to be arranged.

Appendix 7: Diabetes educational meetings 1987.

Programmes from educational meetings held at the Whittington Hospital in 1987.

The Care of Diabetes in General Practice - The Problems of Eyes & Recall.

Practical Experience Looking at Diabetic Eyes (organised jointly with the Department of Clinical Optometry & Visual Science, City University, London.)

Community Care of Type II Diabetic Patients in Islington.

THE CARE OF DIABETES IN GENERAL PRACTICE

- THE PROBLEMS OF EYES & RECALL

AND THEIR POSSIBLE SOLUTIONS

PLACE	ACADEMIC CENTRE WHITTINGTON HOSPITAL HIGHGATE HILL LONDON N19 5NF
TIME & DATE	2.00 pm, WEDNESDAY 22nd JANUARY
CHAIRMAN	Dr. ARNOLD BLOOM

PROGRAMME

2.00 - 2.20	Recognising diabetic retinopathy Dr. V. Mayon-White & Dr. L. Jenkins General Practitioners and Clinical Assistants in Ophthalmology, Stoke Mandeville.
2.25 - 2.45	What are Optometrists and what do they do? Melvin Kaufman, Optometrist, Crouch End.
2.50 - 3.10	Is retinal screening by optometrists effective? Mr J.C. Dean Hart, Ophthalmologist, Bristol.
3.15 - 3.30	Discussion
3.30 - 4.00	TEA
	Have your fundi photographed - Demonstration of Canon Non-Mydriatic Retinal Camera
4.00 - 4.20	Can a computer help with regular recall? Dr. B. Hurwitz, General Practitioner & Research Fellow in Diabetes.
4.20 - 5.00	Open discussion.

Whittington Hospital

Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

THE CITY UNIVERSITY

Department of Optometry & Visual Science
Dame Alice Owen Building
311-321 Goswell Road London EC1V 7DD

PRACTICAL EXPERIENCE LOOKING AT DIABETIC EYES.

JOINT GENERAL PRACTITIONER & OPTOMETRIST UPDATE ON DIABETIC RETINOPATHY & ISLINGTON DIABETIC SHARED CARE.

MONDAY 8th SEPTEMBER 2pm-5pm. Academic Centre, Whittington Hospital.

2.00 -2.10	Welcome	Dr B Hurwitz. Research Fellow, Whittington Hospital.
2.10-2.30	How to recognise Diabetic Retinopathy.(slides).	Dr J Yudkin. Consultant Physician Whittington Hospital.
2.30-2.40	Discussion	
2.40-3.00	Visual Acuity & Refraction In Diabetic Patients.	Mr D F Edgar. Lecturer in Clinical Optometry, City University.
3.00-3.10	Discussion	
3.10-4.00	Case Demonstrations & Tea	
	BRING YOUR OWN OPHTHALMOSCOPES. We will ask diabetic patients with different retinopathies to allow us to improve our skills.	
4.00-4.20	How will we evaluate Diabetic Shared Care in Islington ?	Dr B Hurwitz.
4.20-4.40	How is Diabetic Retinopathy treated & how effective is the treatment ?	Dr A G Caswell, Research Fellow, Moorfields Hospital.
4.40-5.00	Discussion.	

Organised by:

Whittington Diabetic Unit & Department of Clinical Optometry & Visual Science The City University, Islington, London EC1.

P R O G R A M M E

THURSDAY 10th DECEMBER, 1987 2pm-3pm

Academic Centre, Whittington Hospital

Community Care of Type II Diabetic Patients in Islington

Introduction	Dr John Yudkin
The computer's contribution to patient care	DrBrian Hurwitz
GP & Optometrist records and feedback	
Timetable and evaluation of the project	

Appendix 8: GP manual.

A GP Manual was sent to all participating practices at the start of the study. It contained an explanation of how prompting was to work (shown here) together with sample review forms each of which was preceded by a sheet of acetate on which directions appeared explaining their use (not included). This appendix also shows the letter sent to GPs informing them which patients had been randomised to prompted care.

COMMUNITY CARE OF NON-INSULIN TREATED DIABETIC PATIENTS

REFERENCE MANUAL FOR PARTICIPATING GPs

How Will Community Diabetic Care Work?

Patients will be asked to see you for review of diabetes 6 monthly. They will come to the surgery about 10 days after a blood and urine test. The results of these tests will be entered on a self-copying diabetic record which the patients will bring to your surgery. The records will also contain relevant clinical details about the diabetic history.

Investigations

Twice a year patients will be sent request forms and asked to attend a local health centre, or the hospital laboratory:

to have **blood tests** - for random plasma glucose & HbA_1

to have an **MSU** - to be checked for albumin & infection.

The results of these tests will be sent back **to the patients** on a medical record which they will bring to the surgery.

Clinical Review In General Practice

The medical records consist of either a **regular review form** or an **annual review form**. They are designed to provide a basic structure to the diabetic consultation. You are asked to record clinical information on the middle third of the form. After completion, the back copy should be returned to the Diabetic Unit, and the top copy should be filed in the GP notes. The lower third of the form consists of guidance notes only and can be detached and discarded to facilitate filing in the Lloyd George Folder. Copies of specimen forms already filled out by a GP are included overleaf.

Eyes

Once a year, patients will be asked to attend an optometrist with a special interest in diabetic retinopathy. They will be sent an optical record which will be completed on the basis of dilated fundoscopy and refraction. A copy of the optometrist's report will be sent to the general practitioner to be filed as part of the diabetic record. A specimen copy is included in this manual. Optometrists will be able to refer patients for a hospital ophthalmic opinion directly, in which case the GP will be informed. Any patient already attending a hospital department for ophthalmic review will **not** be asked to see an optometrist in addition.

Please note, the design of the records and reminders may be modified slightly in the light of comments and experience.

Whittington Hospital

Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

Dear

RE: Community Diabetic Care

Please note that the following additional patient(s) has/have now been randomised to you/your practice for the routine care of their diabetes:-

Name	Address	Approx. date for next review

As usual at the appropriate time, they will be prompted from the hospital to have blood and urine tests and then to see you for clinical review with the results of these tests.

Yours sincerely,

Dr John S Yudkin
Consultant Physician in Charge
Diabetic Clinic

Appendix 9: Optometry manual.

Optometry Manual sent to all participating optometrists at the start of the study.

Whittington Hospital

Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

Dear

Further to our recent letter about the community care of diabetes, we enclose a copy of the letter which will be sent to patients asking them to have an eye test. This will be accompanied by a list of optometrists who are participating in this scheme as well as a map of their locations. The patient will be sent the optometrists' form with their name and details filled out. You have already seen this form and we enclose a set of definitions of the types of retinopathy which you are being asked to screen for. This list has been taken from 'Diabetic Eye Disease - An Illustrated Guide to Diagnosis and Management'. We enclose a copy of this book for your information and interest. It contains a clear exposition of the varieties of diabetic eye disease together with excellent photographs.

Patients will be prompted to attend for eye tests within the next four weeks. If you have any problems please do not hesitate to contact us. Our assistant, Caroline Goodman, is available for enquiries Monday to Thursday on the following Whittington Hospital extension - 4209.

Thank you for participating in this community care initiative.

Yours sincerely

Dr John S Yudkin

Dr B Hurwitz

Enclosures:

DEFINITIONS OF DIABETIC RETINOPATHY

Types	Ophthalmoscopic abnormalities
BACKGROUND	Retinal vein dilatation Microaneurysms (dots) Retinal haemorrhages (blots) Hard exudates
MACULOPATHY	Macular oedema Diffuse maculopathy Circinate maculopathy
PRE-PROLIFERATIVE	Soft exudates (cotton wool spots) Venous beading and reduplication Arteriolar sheathing
PROLIFERATIVE	New vessels Pre-retinal and vitreous haemorrhage

Definitions taken from 'DIABETIC EYE DISEASE - An illustrated guide to diagnosis and management' by E Kritzinger and K Taylor 1984.

Whittington Hospital

Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

Dear

Community Care of Diabetes

You are now due for an annual eye test. I enclose a list of local optometrists who will test your eyesight and check the back of your eyes for early signs of diabetic eye disease. You may attend whichever optometrist is most convenient for you and there will be no charge. Please attend ***an optometrist from the enclosed list*** and make an appointment either by phone or in person within the next two weeks.

I enclose a special optical record for you to take to the optometrist when you attend for the eye test. If there are any important abnormalities found you will be referred for a specialist examination at the hospital.

Yours sincerely,

Dr John S Yudkin
Consultant Physician in Charge
Diabetic Clinic

ENC:

Appendix 10: Letters to patients requesting participation in the study.

Letters to patients concerning participation in the study:

- letter requesting informed consent and form for their reply
- letter of thanks for agreeing to take part in the study and informing patient of randomisation: to prompted group
- letter of thanks for agreeing to take part in the study and informing patient of randomisation: to continue attending hospital diabetic clinic
- letter of reassurance to those patients who refused to take part in the study.

Whittington Hospital

Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

7th December, 1987

Dear

Informed Consent for Community Diabetic Care

I am writing to tell you about new arrangements for the care of diabetes in this District, and to ask you if you would be prepared to attend your GP instead of the hospital clinic for the routine care of your diabetes. Your GP will provide medical care and local opticians will screen for diabetic eye disease in exactly the same way we currently do it in the hospital clinic.

If you agree to this change we will send you reminders to have a blood glucose test and then to see your GP. You will also receive a yearly reminder to attend a local optician for an eyesight test and a check for diabetic eye disease.

If you need to see a dietician or chiropodist, or a specialist opinion is required, this will be arranged. The reminders will be sent to you from the hospital with the help of a computer. We want to see how well these arrangements work by monitoring how patients who attend their GP get on when compared with a similar group of patients who continue to attend the hospital diabetic clinic. Since we do not yet know which patients are going to be included in each group, you may find that despite agreeing to be transferred to GP care, you are asked to continue to attend the hospital clinic.

Your GP has agreed to provide diabetic care as long as you agree to transfer from the hospital clinic. Please tick the 'Yes' box on the attached consent form if you are happy with these arrangements and you will be sent further details shortly. If you do not wish to be transferred to your GP for your diabetic care tick the 'No' box. Please return the form in the stamped, addressed envelope as soon as possible. If you are unsure and want to talk to me or my Research Fellow Dr Brian Hurwitz you can ring me on 272 3070 ext 4189.

Yours sincerely,

Dr J Yudkin, Consultant Physician in Charge Diabetic Clinic
Enc:

Whittington Hospital

Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

Community Diabetic Care Patient Consent Form

Please tick **one** box below, sign and return in the enclosed stamped, addressed envelope as soon as possible.

NAME:.....

GENERAL PRACTICE:.....

YES [ ] I agree to take part in this study of the community care of diabetes and for the Family Practitioner Committee to supply details of any change of address or GP I may make over the next 3 years. I also agree to clinical data about my health being held on a computer at the Whittington Hospital.

NO [ ] I do not wish to take part in this study of the community care of diabetes.

Signed:..... Date:.....

Whittington Hospital
Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

ROYAL NORTHERN HOSPITAL
HOLLOWAY ROAD, LONDON N7 6LI

21/3/88 - Letter sent to GP group of patients - next appointment not imminent/ under hospital eye clinic

March, 1988

Dear

COMMUNITY DIABETIC CARE

Thank you very much for agreeing to take part in the study of community diabetic care.

When I last wrote to you I explained that those patients participating in the study would be randomly allocated into two groups. One group of patients would transfer to GP Care while the other group would remain under the care of the hospital diabetic clinic.

You have been selected to transfer to your general practitioner for your diabetic care. This means that your GP will provide medical care but you should continue to attend the hospital eye department for your eye care

How will Community Diabetic Care work?

When due for a diabetic check-up, you will receive a letter from the hospital asking you to have a blood and urine test followed by a letter reminding you to see your GP for review of your diabetes. If you need to see a dietician or chiropodist, or a specialist opinion is required, this will be arranged.

Please do not hesitate to ring me or my Research Assistant Caroline Goodman, on 272 3070 ext 4189, if you have any queries.

Yours sincerely,

Dr J S Yudkin
Consultant Physician in Charge
Diabetic Clinic

Letter sent to participating patients - HOSPITAL GROUP

Whittington Hospital

Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

ROYAL NORTHERN HOSPITAL
HOLLOWAY ROAD, LONDON N7 6LI

10th March 1988

Dear

Re: Community Diabetic Care

Thank you very much for agreeing to take part in the Study of Community Diabetic Care.

When I wrote to you last I explained that those patients participating in the Study would be randomly allocated into two groups. One group of patients would transfer to GP care while the other group would remain under the care of the hospital diabetic clinic.

You have been selected to remain with the hospital clinic for the care of your diabetes. This means that although you remain part of the Study **you should continue to attend all your appointments at the hospital diabetic clinic in exactly the same way as before.**

Thank you for your cooperation.

Yours sincerely,

Dr J S Yudkin MD MRCP
Consultant Physician in Charge
Diabetic Clinic

Whittington Hospital
Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

ROYAL NORTHERN HOSPITAL
HOLLOWAY ROAD, LONDON N7 6LI

9th March 1988

Dear

Thank you for responding to our letter about community diabetic care.

I quite understand that you do not wish to take part in this study. Please continue to attend the hospital clinic for the care of your diabetes as before.

Yours sincerely

Dr J S Yudkin MD MRCP
Consultant Physician in Charge
Diabetic Clinic

Appendix 11: Patient questionnaire.

Patient questionnaire with responses shown (n=39 unless otherwise stated).

Whittington Hospital

Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

ROYAL NORTHERN HOSPITAL
HOLLOWAY ROAD, LONDON N7 6LI

24th July 1989

Re: Community Diabetic Care

Dear

We are writing to ask if you would be kind enough to give us your views about the community care of your diabetes. When we originally asked you to transfer from the hospital diabetic clinic to community medical care, we promised that we'd monitor how well this new system of care worked.

We enclose a questionnaire about community diabetic care. Please spend 10-15 minutes answering the questions, and adding any comments you wish to make, so that we can know **your views** on how community care affects you and your diabetes.

This questionnaire is absolutely **confidential** so that you can feel free to state your opinion with complete frankness. It is divided into 6 sections. Each section should take you only a few minutes to answer.

If you find any difficulty with the questions, **PLEASE DON'T GIVE UP!** You can telephone for help from Caroline Goodman in the Diabetic Laboratory. Tel: *272 3070 ext 4189 Mondays to Thursdays between 10 am & 4 pm.* She will be pleased to help. You may identify yourself to her as *"a questionnaire patient"* to preserve confidentiality if you wish.

Please return the questionnaire to us in the stamped addressed envelope as soon as possible.

Thank you for your help and attention.

Yours sincerely,

Dr J Yudkin,
Consultant in Charge of Diabetic Care

Dr B Hurwitz,
General Practitioner.

COMMUNITY CARE OF DIABETES QUESTIONNAIRE

Sent to 42 patients.
39 replies received. } 93% response rate.

Introduction

Community care of diabetes involves having blood and urine tests followed a short time later by a consultation with the doctor in general practice. Once a year, your eyes are checked by an optometrist with a special interest in diabetic eye problems.

Please answer the following questions by placing a tick in the box next to your chosen answer like this: ✓

EXAMPLE

How old are you?

	n		%
31 - 40	1		3
41-50	2	1	5
51-60	8	2	21
61-70	14	3	36
71-80	14	4	36

Section 1 Arrangements For Blood & Urine Tests

1 Where do you most often attend for the blood and urine tests?

	n		%
Royal Northern Hospital Laboratory	12	1	31
Hornsey Central Hospital	3	2	8
River Place Health Centre	0	3	0
Whittington Hospital Laboratory	16	4	41
Goodinge Health Centre	2	5	5
Hornsey Rise Health Centre	2	6	5
Your own doctor's surgery	3	7	8
missing	1		3

The following questions are about the test centre which you attend most often:

2 How far is the test centre from your house?

	n		%
less than half a mile away	10	1	26
between half -1 mile away	12	2	31
between 1-2 miles away	4	3	10
between 2-3 miles away	6	4	15
more than 3 miles away	5	5	13
unanswered	2		5

3 How long does it take you to travel **one way** to this test centre?

	n		%
Less than 15 minutes	12	1	31
15 - 30 minutes	16	2	41
30 - 60 minutes	7	3	18
More than 60 minutes	2	4	5
unanswered	2		5

4 Please state means of transport to the blood test centre:

	n		%
Walking	13	1	33
Bus	18	2	46
Car	5	3	13
Taxi	0	4	0
Dial-a-ride	0	5	0
Other(please state)	2	6	5
unanswered	1		3

---

5 How much does a **return journey** to the test centre and home again cost you?

	n		%
Free	27	1	70
Less than 50p	0	2	0
50p - £1	5	3	13
£1 - £1•50	2	4	5
£1•50 - £2•00	3	5	8
£2 - £2•50	1	6	3
Over £2•50	0	7	0
Unanswered	1		3

6 Do you usually combine a trip to the test centre with other activities (eg shopping, visiting friends or relatives)?

		n	%
Yes	1	9	21
No	2	31	80

7 After you arrive in the test centre, how long do you usually have to wait before the nurse takes your blood sample?

		n	%
Less than 15 minutes	1	12	31
15 - 30 minutes	2	16	41
30 - 60 minutes	3	7	18
More than 60 minutes	4	2	5
unanswered		2	5

8 Overall, are these arrangements for having blood and urine tests

		n	%
Very acceptable	1	14	36
Acceptable	2	23	59
Unacceptable	3	1	3
Very unacceptable	4	0	0
unanswered		1	3

9 If you have any comments about acceptability please mention them.

see text

10 Please mention any other comments you may have about the arrangements for blood and urine tests.

see text

Section 2 Return of Blood & Urine Test Results

The results of the blood & urine tests are returned to you on a special diabetic record for you to take to the doctor. You are, of course, entitled to read the test results, and to look at your diabetic record.

11 Do you read the test results and your diabetic record?

		n	%
YES	1	25	64
NO	2	13	33
unanswered		1	3

12 If YES how much of the diabetic record do you understand?

		n	%
All of it	1	1	3
Most of it	2	7	18
A little of it	3	18	46
None of it	4	6	15
unanswered		7	18

13 Is there any information about your diabetes which in your opinion is missing from this record?

		n	%
YES	1	4	10
NO	2	16	41
DON'T KNOW	3	15	39
unanswered		4	10

14 If YES please state what is missing

_____

_____

_____

15 Have you ever been worried or upset by anything you have seen on the record?

		n	%
YES	1	3	8
NO	2	31	80
unanswered		5	13

16 If YES please state what sort of thing has upset you

see text

17 Have you ever been reassured by anything you have seen on the record?

		n	%
YES	1	4	10
NO	2	20	51
unanswered		15	39

18 If YES please state what sort of thing you found reassuring

see text

19 Is there anything on the diabetic record which in your opinion should be removed from the record?

		n	%
YES	1	0	0
NO	2	15	38
DON'T KNOW	3	19	49
unanswered		5	13

20 If YES please state what sort of thing should be removed from the record.

see text

21 Would you find it helpful to keep a copy of your diabetic record?

		n	%
YES	1	20	51
NO	2	11	28
DON'T KNOW	3	3	8
unanswered		5	13

22 Please mention any other comments about your diabetic record below

see text

Section 3 Diabetic Review By General Practitioners

Review of your diabetes occurs in general practice soon after you receive the record with the results of your blood & urine tests.

23 After you receive your test results do you make an appointment to see the doctor, or do you attend the practice in a non-appointment surgery?

		n	%
Appointment surgery	1	23	59
Non appointment surgery	2	13	33
Don't Know	3	1	3
Unanswered		2	5

24 Do you see a particular doctor at the practice for diabetic review, or are you happy to see whoever is available?

		n	%
One particular doctor	1	24	62
Whichever doctor is available	2	12	31
Either	3	3	8

25 Does the doctor who usually reviews your diabetes discuss the results of your blood sugar test with you?

		n	%
YES	1	28	72
NO	2	9	23
Sometimes	3	2	5

26 In your opinion, does the doctor who usually reviews your diabetes apply the same standard of blood sugar control as the hospital clinic?

		No	%
YES	1	22	56
NO	2	4	10
DONT KNOW	3	11	28
unanswered		2	5

27 Do you feel that the GP makes a thorough assessment of your diabetes?

		No	%
Very thorough assessment	1	13	33
Thorough assessment	2	9	23
Adequate assessment	3	12	30
Poor assessment	4	3	8
Very poor assessment	5	0	0
unanswered		2	5

28 Do you trust the GP to monitor your diabetes as well as, or better than, the hospital clinic?

		n	%
Better than the hospital clinic	1	3	8
As well as the hospital clinic	2	32	82
Worse than the hospital clinic	3	3	8
unanswered		1	3

29 Please make any comments you wish about the medical review of your diabetes in general practice.

See text

Section 4 Community Diabetic Eye Care

Once a year, you receive a reminder to have an eye test, together with a map of optometrists who have a particular interest in diabetic eye problems. 10/39 patients attended hospital eye clinic only.

30 How far away (**one way**) is the optometrist who last checked your eyes for diabetic eye disease?

		n=29	%
Half a mile or less	1	12	41
Between half a mile and 1 mile away	2	7	24
Between 1 to 2 miles away	3	3	10
Between 2 to 3 miles away	4	2	7
More than 3 miles away	5	4	14
Unanswered		1	3

31 How long does it take you to travel **one way** to the optometrist for an eye check-up?

		n=29	%
Less than 15 minutes	1	10	26
15 - 30 minutes	2	10	26
30 - 60 minutes	3	3	8
More than 60 minutes	4	5	13
Unanswered		1	3

32 Please state means of travel to the optometrist.

		n=29	%
Walking	1	14	48
Bus	2	11	38
Car	3	2	7
Taxi	4	0	0
Dial-a-ride	5	0	0
Other (please state)	6	1	3
Unanswered		1	3

33 How much does a **return journey** to the optometrist and home again cost you?

		n = 29	%
Free	1	23	80
Less than 50p	2	0	0
50p - £1	3	2	7
£1 - £1•50	4	0	0
£1•50 - £2	5	2	7
£2 - £2•50	6	0	0
Over £2•50	7	1	3
unanswered		1	3

34 Did the last optometrist to check your eyes for diabetic eye problems put drops in your eyes before examining them?

		n = 29	%
YES	1	24	83
NO	2	2	7
DON'T KNOW	3	1	3
unanswered		2	7

If YES, did the optometrist warn you about:

35 The possible effect of glare from bright light?

		n = 25	%
YES	1	13	52
NO	2	6	24
DON'T KNOW	3	6	24

36 If the optometrist put drops in your eyes were you warned about what to do if you felt any pain in your eyes in the 24 hours following the eye-drops?

		n = 25	%
YES	1	7	28
NO	2	16	64
DON'T KNOW	3	2	8

37 In your opinion, is the eye test by an optometrist

		n=29	%
Better than the eye check-up in the hospital clinic	1	9	31
As good as the eye check-up in the hospital clinic	2	14	48
Worse than the eye check-up in the hospital clinic	3	1	3
unanswered		5	17

38 Overall, are these arrangements for your eye check-ups in the community

		n=29	%
Very acceptable?	1	13	45
Acceptable?	2	15	52
Unacceptable?	3	0	0
Very unacceptable?	4	0	0
unanswered		1	3

39 If you have any comments about acceptability please mention them.

see text

40 Are there any further comments you'd like to make about community eye check ups?

see text

Section 5 Referral To Additional Diabetic Services

Your GP can use the diabetic record to refer you for additional services.

41 Since you started community diabetic care have you been referred **by your doctor** to

A dietitian ? ☐	1	see text
A chiropodist ? ☐	2	
A hospital diabetic clinic ? ☐	3	
A hospital eye specialist ? ☐	4	

42 If you have been referred to any of these services, were there any problems or difficulties involved in the referral (eg getting an appointment)? Please explain.

See text

43 Do you feel that dietary advice is as easily available to you in community diabetic care as it was in the hospital diabetic clinic?

Less available ☐ 1
As easily available ☐ 2
More available ☐ 3
Don't know ☐ 4

See text

44 Do you feel that chiropody is as easily available to you in community diabetic care as it was in the hospital diabetic clinic?

Less available ☐ 1
As easily available ☐ 2
More available ☐ 3
Don't know ☐ 4

See text

45 If you have been referred to a hospital eye clinic **by an optometrist**, were their any problems or difficulties involved in getting seen in hospital (for example delay in receiving an appointment)?

YES ☐ 1
NO ☐ 2

See text

If yes please explain.

See text

46 Overall, in your experience, how do you feel that community diabetic care compares with the diabetic care you received at the hospital diabetic clinic?

		n	%
Better	[2]	1	5
As good	[30]	2	77
Worse	[4]	3	10
Unanswered		3	8

47 In your experience, what are the **best** things about community diabetic care (you may mention more than one aspect)?

see text

48 In your experience, what are the **worst** things about community diabetic care (you may mention more than one aspect)?

see text

49 In your experience, what were the **best** things about attending the hospital diabetic clinic (you may mention more than one aspect)?

see text

50 In your experience, what were the **worst** things about attending the hospital diabetic clinic (you may mention more than one aspect)?

see text

Appendix 12: GP questionnaire.

GP questionnaire with responses shown (n=31 unless otherwise stated).

Whittington Hospital

Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

Wednesday 11th July 1990

Dear

COMMUNITY DIABETIC CARE

Prompted community diabetic care of a group of non-insulin treated patients has now been in operation in the majority of participating practices for 2 years. We are keen to know your views on how acceptable this support system is to general practitioners providing clinical reviews for their patients.

We enclose a questionnaire which we would be grateful if you would respond to as soon as possible. It should take only about 5-10 minutes to complete.

Your individual responses will be available only to the research team for evaluation purposes. They will not be made available to the DHA or any third party. Confidentiality and anonymity will be maintained in any analysis and subsequent publication of the results of this questionnaire.

Please return the questionnaire to the hospital in the enclosed stamped addressed envelope.

Thank you for your cooperation

Yours sincerely,

Dr John S Yudkin MD FRCP
Consultant Physician in Charge Diabetic Clinic

Dr Brian Hurwitz
Research Fellow and General Practitioner

Caroline Goodman
Research Assistant

I.D. NO:

PROMPTED COMMUNITY CARE OF DIABETES
CONFIDENTIAL QUESTIONNAIRE TO GENERAL PRACTITIONERS

INTRODUCTION

The community diabetic recall system comprises 6 monthly prompts to non insulin treated patients for blood and urine tests. This is followed by a further prompt which includes a personalised diabetic clinical review form for each patient to take to their GP when they attend for clinical review. After clinical assessment, the top copy of this form is retained by the general practitioner. The bottom copy which also contains clinical details of the GP assessment, including possible requests for referral, is returned to the hospital.

Once a year, patients are also sent a prompt to attend an optometrist for an eye test and dilated fundoscopy. The optometrist may make a referral directly to the hospital ophthalmologist if thought necessary. A copy of the optometrist's review is sent to the general practitioner.

During a pilot study 100 patients have had their diabetes reviewed in this manner over the past 2 years. Some GPs have had several patients in the scheme, others have had only 1 or 2. This questionnaire seeks to elicit the views of general practitioners as to the functioning of this recall system. Questionnaires will also be sent to optometrists and to the patients. The responses we receive will be carefully considered and fed back to you.

Please circle the **number** or enter your responses where appropriate

1. In your opinion, is this prompting and recall system a satisfactory method of organisation for supporting the clinical care of non-insulin treated diabetics in your practice?
[please circle]

Very Poor				**Excellent**	
1	2	3	4	5	mean score 4.3

2. How do you feel about providing clinical care to your non-insulin dependent diabetic patients using this system?
[please circle]

Not at all confident				**Very confident**	
1	2	3	4	5	mean score 4.0

Please comment: _____

_____

3. Has participating in this community diabetic care scheme caused any problems or difficulties within your practice? [please circle] **Yes** **No**

1 30 (97%)

Please comment: _____

_____

4. We would like to know how you find the clinical review forms work when reviewing a diabetic patient. Are/Do the forms: [please circle]

						mean score
	Useless				**Useful**	
	1	2	3	4	5	4.3
n=29	**Too Simple**				**Too Complex**	
	1	2	3	4	5	3.0
	Provide Too Little Space				**Provide too Much Space**	
	1	2	3	4	5	3.0

5. Please indicate below any modifications to the forms which you would find helpful including omissions or further inclusions. You may write on the enclosed clinical review form attached to the back of this questionnaire - if you wish.

see text

6. Do you find that the method of referral [to dietitian, chiropodist, or diabetic clinic] using the referral boxes on the clinical review form, is acceptable? [please circle] **Yes** **No**

Any Comments see text 20 1

90%

(2 unanswered)

7. Following clinical review, the bottom copy of the form is returned to the hospital and the top copy is retained in GP notes. We are interested to know **where** within the GP notes these top copies are filed.
[please circle the number[s] which applies]

1 With the letters
2 With the lab results
3 In the hand-written notes section
4 In a separate section of their own within the notes
5 Chronologically with lab results and letters

see text

6 Other - please state _____

8. The current design produces a fixed frequency of prompting for blood tests and clinical review with recall at 6 monthly intervals unless the GP makes a specific request.

Do you feel prompting should be:-
[please circle]

see text

1 More frequent for all patients
2 Less frequent for all patients
3 Not at fixed intervals - but triggered by GP decision about when the next review should occur
4 Other [please state] _____

Please Comment _____

_____

9. About how long does it usually take you to complete:

		mean
1	Annual Review assessment & review form ___ minutes?	13.4
2	Regular Review assessment & review form ____ minutes?	9.8

10. This system has been designed to allow patients to attend for diabetic review within a normal surgery, with or without an appointment.

Do you run an appointment system? [please circle]

Yes	No
24	7
77%	23%

If NO, go to question 11
If YES,

1 What proportion of your surgery hours are appointment only?
[please circle the percentage]

<25% 25% 50% 75% 100%

2 How long are the appointment intervals which you offer?
[please circle the time]

5 mins 7.5 mins 10 mins 15 mins

see text

11. Does seeing a diabetic patient for clinical review disrupt your surgery to any appreciable extent?
[please circle]

A great deal				Not at all	mean score
1	2	3	4	5	4.3

12. Do you wish to continue participating in this prompting and recall system for diabetic care?
[please circle]

Yes	No
28	3
90%	

IF NO please go to question 13.

IF YES:

1 Would you be prepared to have more patients attending your surgery for their diabetic care within this framework? [please circle]

Yes	No	Undecided
19	1	5
68%	4%	18%

IF NO please go to question 13

(3 unanswered)

IF YES
[please circle proportion of diabetic patients on your list you might consider reviewing regularly]

2	Non-Insulin Treated	25%	50%	75%	100%	see text
3	Insulin Treated	25%	50%	75%	100%	

13. In what way would your response to Q12 be different if payment by the FPC for this work could be negotiated on the basis that systematic diabetic review was being undertaken albeit not in a GP clinic session?

Please comment: see text

It has been said that some shared care schemes can result in a degree of ambiguity as to who is adopting the clinical responsibility for patient care.

14. On completing the clinical review forms and returning them to the hospital, have you assumed that these forms are checked by anyone? Please circle any of the following which you believe most genuinely reflects the procedure adopted by the hospital.

1 The forms are checked for full completion only, with no regard to clinical content.
2 The forms are checked for clinical content by the community diabetic care coordinator (non medical).
3 The forms are checked for clinical content by a research fellow/registrar.
4 The forms are checked for clinical content by Dr Yudkin.
5 Other [please state]

see text

15. On returning a copy of the clinical review form would you assume that a doctor from the diabetic unit might contact you for further information about a particular patient?

[please circle] **Yes** **No**
28 3
90%

16. In the current system, who do you feel takes clinical responsibility for these prompted patients?
[please circle]

GP	**Hospital**	**Both**	**Don't Know**
8 (28%)	3 (10%)	17 (55%)	3 (10%)

Please give your reasons for this choice:

17. In future, do you think that the clinical review forms which are returned to the hospital should be checked by:
[please circle]

1 No-one
2 Project Coordinator (non-medical)
3 Diabetes Specialist Nurse
4 Registrar/Research Fellow
5 Consultant
6 Other please state _____

} see text

18. The majority of patients in this scheme receive retinal screening [dilated fundoscopy] by optometrists. Is the feedback from the optometrist review?
[please circle]

Useless				**Useful**	Mean Score
1	2	3	4	5	4.3

Please comment _____

_____

19. As the system is currently designed one level of intervention by the hospital occurs if a patient has a RBS of 25mmol/l or more. In this case the patient is prompted not to see their GP, but to come straight to the hospital clinic.

In your view, is the RBS level which triggers this action set
[please circle]

1 Too high
2 Too low
3 Correctly
4 Don't know

} See text

Please comment _____

_____

20. What, other clinical or biochemical characteristics if any, do you feel should result in an immediate hospital appointment?

Please comment: see text

_____

21. Were you provided with adequate information in preparation for participating in this study?

Please comment under the following headings:

1 Information sent in advance including manual

2 Back up during the pilot study

see text

Because there have been important changes in the organisation of general practice within the Health Service during the period of this study, we are interested to know how practices participating in this study may have changed, or have plans for changes.

22. Please fill in the following information about your practice characteristics.
We would like information about your practice at the time of joining this pilot study as well as the current situation: [please fill in numbers where appropriate]

	April 1988	July 1990	
1 Monthly number of special clinics			see text
2 Number of appointment surgeries/wk			
3 Practice employed nurse [number of sessions per week]			
4 Number of additional monthly clinics planned			
5 Diabetic clinic planned	**Yes No**	**Yes No**	

RESPONSIBILITY FOR RECALL

Recall is now run on a small computer by a non-medical person with medical advice available as necessary. With only small modifications which would customise it to practice requirements, it could easily be run by a practice administrator/manager/nurse.

23. Would you be interested in having a copy of the software [which runs on any IBM compatible machine] so that you could run your own diabetic recall without reference to the hospital unless referral was indicated. Assume no purchase cost for this software.

[please circle] **Yes** **No**

13 18

58%

State reasons/reservations etc

24. We are interested to know what other kind of support you feel the hospital diabetic unit could provide to promote better community care of diabetes.

see text

Thank you for answering this questionnaire

PLEASE RETURN THE COMPLETED QUESTIONNAIRE
IN THE ENVELOPE PROVIDED

Appendix 13: Optometry questionnaire.

Optometry questionnaire with responses shown (n=10 unless otherwise stated).

Whittington Hospital

Archway Wing
Highgate Hill, London N19 5NF
01-272 3070 ext

Wednesday 13 February, 1991

Dear

COMMUNITY DIABETIC CARE

Prompted community diabetic care of a group of non-insulin treated patients has now been in operation for 2½ years. We are keen to know your views on how acceptable this support system is to optometrists providing retinal screening for these patients.

We enclose a questionnaire which we would be grateful if you would respond to as soon as possible. It should take only about 5 minutes to complete.

Your individual responses will be available only to the research team for evaluation purposes. They will not be made available to the DHA or any third party. Confidentiality and anonymity will be maintained in any analysis and subsequent publication of the results of this questionnaire.

Please return the questionnaire to the hospital in the enclosed stamped addressed envelope.

Thank you for your cooperation

Yours sincerely

Dr John S Yudkin MD FRCP
Consultant/Senior Lecturer in
General Medicine and Diabetes

Dr Brian Hurwitz
Research Fellow and
General Practitioner

Caroline Goodman
Research Assistant

14 questionnaires sent } Response rate 71%
10 received back }

ID No:

PROMPTED COMMUNITY CARE OF DIABETES

CONFIDENTIAL QUESTIONNAIRE TO PARTICIPATING OPTOMETRISTS

Introduction

This questionnaire seeks to elicit the views of participating optometrists as to the functioning of the recall system. This comprises biannual prompts to non-insulin treated patients for blood and urine tests followed by clinical review in general practice and annual prompts to attend an optometrist for refraction and fundoscopy. The optometrist fills out a review form and sends the bottom copy of this form back to the Whittington Diabetic Office. A copy of this review form is then sent to the general practitioner.

During the pilot study, 100 patients have had their diabetes reviewed in this manner over the past 2½ years. Because some of these patients have continued to attend hospital ophthalmic outpatients, only approximately 70 have received retinal screening by optometrists. During this period a total of 143 optometry prompts to patients have been issued.

We would be grateful if you would answer the following questions and add comments. Your responses will be carefully considered and fed back.

Please circle the number or enter your responses where appropriate.

1. In your opinion, is this prompting and recall system a satisfactory method of organising retinal screening for type II diabetic patients?
[please circle]

Very Poor				Excellent	mean score
1	2	3	4	5	4.0

2. How confident do you feel about detecting the following forms of diabetic retinopathy in these patients?
[please circle]

	Not At All Confident				Very Confident	mean score
Background Retinopathy	1	2	3	4	5	4.3
Preproliferative Retinopathy	1	2	3	4	5	4.0
Proliferative Retinopathy	1	2	3	4	5	4.2

3. Do you routinely dilate the pupils of diabetic patients not in this study who attend for refraction and retinal screening?
[please tick]

Never	[1]	10%
Occasionally	[4]	40%
Always (unless contra-indicated)	[5]	50%

4. Have you dilated the pupils of patients in this study who have attended for refraction and retinal screening?
[please tick]

Never	[0]	0
Occasionally	2	20%
Always (unless contra-indicated)	8	80%

5. We would like to know how you find the optometry review forms work when reviewing a diabetic patient. Are the forms:
[please circle]

Useless				**Useful**	mean score
1	2	3	4	5	4.7
Too Simple				**Too Complex**	
1	2	3	4	5	2.6
Provide Too Little Space				**Provide Too Much Space**	
1	2	3	4	5	3.3

6. Please indicate below any modifications which you would find helpful including omissions or further inclusions. You may write on the enclosed optometry review form attached to the back of this questionnaire if you wish.

See text

7a. Have you referred any of the study patients to ophthalmic outpatients?
[please circle]

Yes 50% **No**

If no please go to question 8

If yes:

7b. Do you find that the method of referral using the referral box on the form is acceptable?
[please circle] n = 5

Yes 80% **No** **Other** _____

Comments _____

7c. Have you received any feedback from ophthalmic outpatients about patients in this scheme who you have referred?
[please circle] n = 10

Always 100% **Sometimes** **Never**

8a. Would you be prepared to continue participating in a similar scheme if the number of patients was significantly expanded?
[please circle] n = 10

Yes 100% **No** **Not Sure**

Please elaborate: _____

_____

_____

_____

8b. If your answer to 8a was yes, please indicate approximately how many diabetic patients per month you currently test, and how many extra you could cope with.

Approx No. of diabetic patients currently tested per month.....mean = 6.3
Approx No. of diabetic patients who could be tested per month.....mean = 46

9. In the current prompting system, who do you feel is mainly responsible for detecting and monitoring onset of diabetic eye disease in the study patients?
[please circle the number[s] which applies]

1. **GPs**
2. **Hospital**
3. **Optometrists**
4. **Other - please state** _____
5. **Don't Know**

} see text

Please give reasons tor your choice: _____

_____

_____

_____

THANK YOU FOR ANSWERING THIS QUESTIONNAIRE. PLEASE RETURN THE COMPLETED QUESTIONNAIRE IN THE ENVELOPE PROVIDED.

Appendix 14: Prompted care of Type II diabetic patients.
Hurwitz Goodman & Yudkin, *Br Med J* 1993.

Reprinted from the BRITISH MEDICAL JOURNAL, 6th March 1993, Vol. 306, Pages 624-630

GENERAL PRACTICE

Prompting the clinical care of non-insulin dependent (type II) diabetic patients in an inner city area: one model of community care

Brian Hurwitz, Caroline Goodman, John Yudkin

Abstract

Objective—To evaluate the effectiveness and acceptability of centrally organised prompting for coordinating community care of non-insulin dependent diabetic patients.

Design—Randomised single centre trial. Patients allocated to prompted care in the community or to continued attendance at hospital diabetic clinic (controls). Median follow up two years.

Setting—Two hospital outpatient clinics, 38 general practices, and 11 optometrists in the catchment area of a district general hospital in Islington.

Patients—181 patients attending hospital outpatient clinics.

Null hypothesis—There is no difference in process of medical care measures and medical outcome between prompted community care and hospital clinic care.

Results—14 hospital patients failed to receive a single review in the clinic as compared with three patients in the prompted group ($\chi^2=6{\cdot}1$, df=1; $p=0{\cdot}013$). Follow up for retinal screening was better in prompted patients than in controls; two prompted patients defaulted as against 12 controls ($\chi^2=6{\cdot}9$, df=1; $p=0{\cdot}008$). Three measures per patient yearly were more frequent in prompted patients: tests for albuminuria (median 3·0 *v* 2·3; $p=0{\cdot}03$), plasma glucose estimations (3·1 *v* 2·5; $p=0{\cdot}003$), and glycated haemoglobin estimations (2·4 *v* 0·9; $p<0{\cdot}001$). Continuity of care was better in the prompted group (3·2 *v* 2·2 reviews by each doctor seen; $p<0{\cdot}001$). The study ended with no significant differences between the groups in last recorded random plasma glucose concentration, glycated haemoglobin value, numbers admitted to hospital for a diabetes related reason, and number of deaths. Questionnaires revealed a high level of patient, general practitioner, and optometrist satisfaction.

Conclusions—Six monthly prompting of non-insulin treated diabetic patients for care by inner city general practitioners and by optometrists is effective and acceptable.

London N1 3NG
Brian Hurwitz, *general practitioner*

Department of Medicine, University College School of Medicine, Great Northern Building, Whittington Hospital, London N19 5NF
Caroline Goodman, *research assistant*
John Yudkin, *professor of medicine*

Correspondence to:
Dr B Hurwitz, Departments of Medicine and Primary Health Care, University College School of Medicine, Great Northern Building, Whittington Hospital, London N19 5NF

BMJ 1993;306:624-30

Introduction

In the 1980s several British groups reported on studies which compared the effectiveness of diabetic care provided by general practitioners with care from hospital diabetic clinics. Conclusions ranged from condemnation of general practitioner care as "erratic," of "generally poor standard"[1] and "less satisfactory than care by the hospital diabetic clinic"[2] to a view that organised general practitioner diabetic care "can achieve a degree of glycaemic control... equal to that reached by a hospital clinic."[3] It seemed that effective care could be provided if it was structured and organised. Many authors felt that the best way to structure diabetic care in general practice was for general practitioners to set up miniclinics[4-13] in order to create the "protected time" needed for assessment of a complex condition. The general practitioner contract of April 1990 served to encourage the adoption of this model of care.

Despite an active policy of promoting the development of general practitioner diabetic miniclinics in Islington in the 1980s few local practices succeeded in establishing this service. In 1987 a significant number of local doctors expressed an interest in assuming greater responsibility for the clinical care of non-insulin treated patients if review could be scheduled in normal surgery time and provided responsibility for retinal screening was not included. Taking our cue from the Cardiff group's vision of a system which "would recall the patients to see their general practitioner at regular intervals, warn... and request... both clinical information and blood for estimation of glycosylated haemoglobin,"[2] we have developed a system for prompting community care of non-insulin dependent (type II) diabetes. High street optometrists perform the necessary eye examinations for these patients.[14-19]

Methods

The prompting system aims to enable general practitioners to structure diabetic care without setting up miniclinics. It is based on the same clinical guidelines for outpatient care available to all doctors in the diabetic clinics of the district general hospital. These advise annual clinical review, to include measurement of weight and glycaemic control, urinary albumin value, blood pressure, foot examination, examination of visual acuity, and retinoscopy through dilated pupils. Between annual assessments a regular clinical review of the patient should include all these assessments except foot and eye examinations unless specifically indicated.

THE PROMPTING SYSTEM

The hub of the prompting system is a database which sends requests to patients asking them to provide blood and urine samples for random plasma glucose, glycated haemoglobin, and albumin estimations (fig 1). Samples can be taken by a practice nurse, at a nearby health centre, or at a hospital laboratory, whichever suits the patient. All tests are performed by one district general hospital laboratory. Results are incorporated within personalised medical records which serve as clinical review forms. These are sent to patients with a request to take them along to their general practitioner within 10 days. The prompts for blood and urine tests, followed by general practitioner clinical review, are sent six monthly, with alternate clinical review forms comprising annual review and regular review. Patients not already under the care of a hospital eye clinic also receive an annual

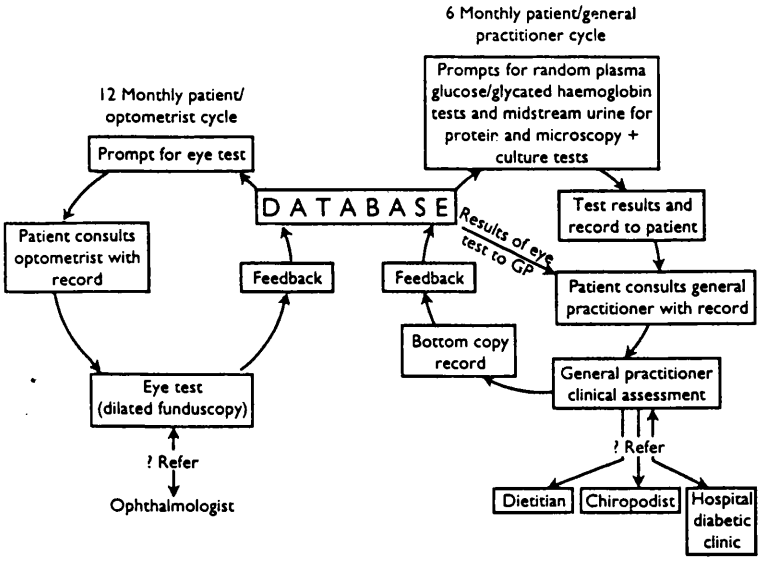


FIG 1—*Design of prompting and recall system*

eye test prompt and a map identifying local optometrists who perform refraction and dilated funduscopy.

The medical and eye review forms include past relevant clinical and biochemical information when known (fig 2). The forms are self copying, and copies completed during clinical assessments are returned to the database to update longitudinal records on each patient. Lack of feedback prompts reminders (see box 1).

PROMPTED CLINICAL ASSESSMENTS

General practitioner clinical assessments parallel those of the hospital clinic and are performed in the knowledge of each patient's recent and previous random plasma glucose and glycated haemoglobin values. If albuminuria has been detected the result of a midstream urine culture is also included. If the review form referral box is ticked an appointment to attend hospital outpatients is sent to the patient and the database sends a copy of the general practitioner or optometrist review findings to the appropriate hospital clinic doctor who will see the patient in outpatients. In the case of referral to a dietitian or chiropodist the database dispatches brief details to the relevant department. Copies of optometry feedback are sent to the patient's general practitioner, who is thereby kept informed of eye assessments. In this scheme, with the approval of participating general practitioners, optometrists may refer patients directly to a hospital eye clinic by ticking the referral box on the optical review form. Any prompted patient referred to a hospital clinic is assessed in the context of the scheme. Further hospital clinic follow up is arranged only in cases of particular need; otherwise the patient is discharged back to prompted community care.

During the period of the pilot project the prompting system and database were paper driven. They were later computerised by using Revelation software operating within MSDOS on an IBM computer (Revtech UK, Basingstoke, Hampshire).

Box 1

Prompting rule set

(1) Patients receive prompts for blood and urine tests six monthly unless more frequent review is requested by the general practitioner

(2) If the results of blood and urine tests are not received by the database within three weeks of such a prompt a reminder is sent. If there is no response after two such reminders a letter is sent to the general practitioner informing of non-response and asking for information. Six months after the initial prompt the next cycle of prompting starts again

(3) The general practitioner review prompt is sent to the patient only when the results of the blood and urine tests have been received by the database. If no copy of the general practitioner review has been received within two weeks of the prompt a telephone call to the general practitioner is made. If it transpires that the patient has not yet attended the general practitioner for this diabetic review one reminder prompt is sent. No response results in the system defaulting to the next prompt six months from the initial blood test prompt

(4) A random plasma glucose concentration between 20·0 and 24·9 mmol/l results in the patient receiving a general practitioner prompt with a covering letter advising attendance at the general practitioner surgery within three days rather than 10 days

(5) A random plasma glucose concentration ≥25 mmol/l results in the database sending an urgent hospital diabetic clinic appointment to the patient rather than a general practitioner review prompt.

EVALUATION

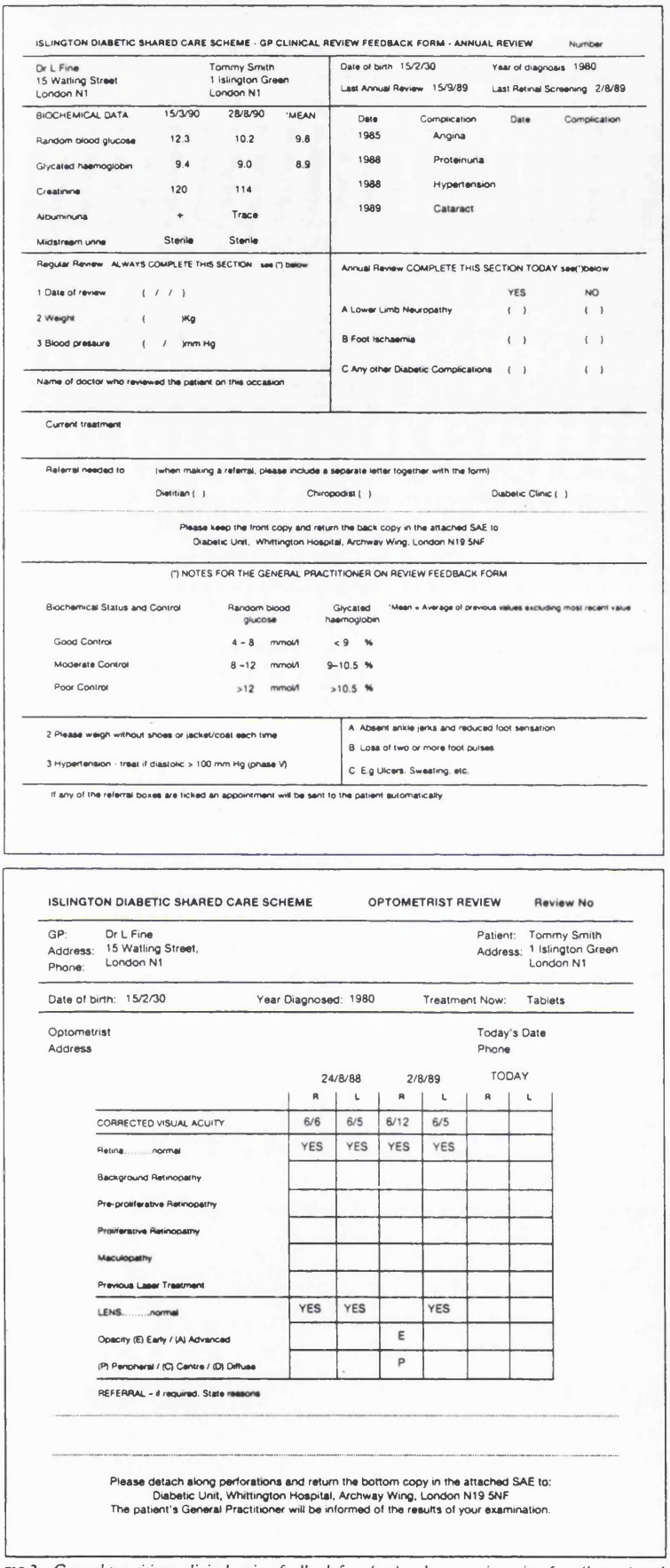
In 1987, with the approval of the local medical and optical committees, Islington general practitioners and optometrists were invited to participate in a pilot prompting project. Thirty eight general practices agreed to take part, including 15 singlehanded and 13 two doctor practices. The general practitioners were sent manuals which explained how prompting would operate, and they attended updating sessions on the management of non-insulin dependent diabetes. A short textbook on diabetic eye disease[20] was sent to each participating optometrist, who also attended educational meetings at which the importance of dilated funduscopy was emphasised.

A randomised controlled trial comparing prompted care with continuing hospital clinic care was undertaken. As the trial was a comparison of two systems of care the prompted care group subjects could be referred through the system to hospital outpatients, while the hospital clinic group patients could consult their general practitioner for diabetes related reasons. The study aimed to include mobile non-insulin dependent diabetic patients under the age of 80 who had attended the district general hospital diabetic clinics in the previous two years. Patients with the following characteristics were excluded: (*a*) women of childbearing age; (*b*) patients with one or more of three established significant diabetic complications—namely, nephropathy with creatinine concentration >150 μmol/l (proteinuria was not in itself an exclusion), ischaemia severe enough to have resulted in gangrene or amputation, and retinopathy worse than background in one eye.

A review of the hospital notes of 570 diabetics registered with the relevant general practitioners identified 415 eligible patients, who were asked in writing for informed consent to enter the trial (fig 3). Of these patients, 215 (52%) agreed to take part, of whom 209 were randomised (by using Cambridge tables of random numbers[21]). There were no significant differences in age or sex between patients who consented and those who did not.

A further 28 patients (13 in the prompted group, 15 controls) were excluded from the study. Table I gives the reasons. Randomisation therefore resulted in 89 eligible patients allocated to prompted care and 92 allocated to remain as controls (fig 3).

Prompting began in the prompted group in April 1988 and patients were phased into prompting accord-



ISLINGTON DIABETIC SHARED CARE SCHEME - GP CLINICAL REVIEW FEEDBACK FORM - ANNUAL REVIEW Number

Dr L Fine
15 Watling Street
London N1

Tommy Smith
1 Islington Green
London N1

Date of birth 15/2/30 Year of diagnosis 1980
Last Annual Review 15/9/89 Last Retinal Screening 2/8/89

BIOCHEMICAL DATA	15/3/90	28/8/90	*MEAN
Random blood glucose	12.3	10.2	9.8
Glycated haemoglobin	9.4	9.0	8.9
Creatinine	120	114	
Albuminuria	+	Trace	
Midstream urine	Sterile	Sterile	

Date	Complication	Date	Complication
1985	Angina		
1988	Proteinuria		
1988	Hypertension		
1989	Cataract		

Regular Review ALWAYS COMPLETE THIS SECTION see (*) below

1 Date of review (/ /)
2 Weight ( )Kg
3 Blood pressure (/)mm Hg

Annual Review COMPLETE THIS SECTION TODAY see(*)below

	YES	NO
A Lower Limb Neuropathy	( )	( )
B Foot Ischaemia	( )	( )
C Any other Diabetic Complications	( )	( )

Name of doctor who reviewed the patient on this occasion

Current treatment

Referral needed to (when making a referral, please include a separate letter together with the form)
Dietitian ( ) Chiropodist ( ) Diabetic Clinic ( )

Please keep the front copy and return the back copy in the attached SAE to
Diabetic Unit, Whittington Hospital, Archway Wing, London N19 5NF

(*) NOTES FOR THE GENERAL PRACTITIONER ON REVIEW FEEDBACK FORM

Biochemical Status and Control	Random blood glucose	Glycated haemoglobin
Good Control	4 - 8 mmol/l	< 9 %
Moderate Control	8 -12 mmol/l	9–10.5 %
Poor Control	>12 mmol/l	>10.5 %

*Mean = Average of previous values excluding most recent value

2 Please weigh without shoes or jacket/coat each time
3 Hypertension - treat if diastolic > 100 mm Hg (phase V)

A Absent ankle jerks and reduced foot sensation
B Loss of two or more foot pulses
C E.g Ulcers, Sweating, etc.

If any of the referral boxes are ticked an appointment will be sent to the patient automatically

ISLINGTON DIABETIC SHARED CARE SCHEME OPTOMETRIST REVIEW Review No

GP: Dr L Fine
Address: 15 Watling Street, London N1
Phone:

Patient: Tommy Smith
Address: 1 Islington Green London N1

Date of birth: 15/2/30 Year Diagnosed: 1980 Treatment Now: Tablets

Optometrist
Address

Today's Date
Phone

	24/8/88		2/8/89		TODAY	
	R	L	R	L	R	L
CORRECTED VISUAL ACUITY	6/6	6/5	6/12	6/5		
Retina.....normal	YES	YES	YES	YES		
Background Retinopathy						
Pre-proliferative Retinopathy						
Proliferative Retinopathy						
Maculopathy						
Previous Laser Treatment						
LENS.....normal	YES	YES		YES		
Opacity (E) Early / (A) Advanced			E			
(P) Peripheral / (C) Centre / (D) Diffuse			P			

REFERRAL - if required. State reasons

Please detach along perforations and return the bottom copy in the attached SAE to:
Diabetic Unit, Whittington Hospital, Archway Wing, London N19 5NF
The patient's General Practitioner will be informed of the results of your examination.

FIG 2—*General practitioner clinical review feedback form (top) and optometrist review form (bottom) used in Islington diabetic shared care scheme*

ing to when their next hospital clinic appointment would have been due. The study continued for a total of two years six months (median two years), at the end of which the patients' hospital and general practitioner notes were reviewed together with records of prompted clinical and eye reviews. Information on mortality was obtained from general practitioner notes, hospital information systems, and family health services authority returns on deaths and departed patients.

TABLE I—*Reasons for patients found to be ineligible for study after informed consent*

	No ineligible
Not seen in hospital clinic for more than two years at start of study	17
Withdrew consent before prompting started	3
Found to be on insulin at start of study	5
Had significant nephropathy at start of study	1
Patient had left locality at start of study	1
Previous hospital notes lost at start of study	1
Total	28

A detailed questionnaire was sent to all patients (n=44) who had received 12 months of prompts—that is, five separate prompts—by May 1989 to elicit their views on the acceptability of these arrangements. Questionnaires were also sent to participating general practitioners and optometrists.

Results

The results are based on an intention to treat analysis. Comparisons of control and prompted patient groups at the start of the study are shown in table II. The groups were well matched for demographic variables and also for most important diabetic attributes, although mean systolic blood pressure was recorded as 9 mm Hg greater in the control group (95% confidence interval 2·1 to 16·0 mm Hg; p=0·011) and 14 patients in the prompted group were documented as having signs of leg ischaemia compared with only four controls (χ^2=5·7, df=1; p=0·017).

PROCESS OF CARE

During the study period 333 prompts for blood and urine tests generated 296 sets of results, an 89% completion rate (table III). Of the consequent 296 prompts requesting general practitioner clincial review, 275 were completed (93% compliance with general practitioner prompts, 83% completion rate of both blood tests and general practitioner reviews). Of 145 prompts for eye tests by optometrists, 125 (86%) were completed.

Fourteen (15%) of the control group failed to be seen again in a hospital diabetes clinic during the study period compared with only three (3·4%) of the prompted patients who failed to attend for clinical diabetic review (p=0·013; table IV). In those patients who did not default from follow up all the clinical process of care measures were carried out more frequently in the prompted group; for most comparisons the differences were significant. The prompted group also received greater continuity of care, the number of diabetic reviews performed by each participating doctor being significantly greater than in the hospital clinic group (3·2 *v* 2·2 respectively; p<0·001). There was no difference in the number of patients referred for dietary advice or chiropody.

At the end of October 1990, 94% (170/181) of the general practitioner notes for the study patients were traced. With the exclusion of prompted consultations for diabetic review they disclosed a high annual consultation rate for both groups (8·1 in the prompted group *v* 6·4 per year in the controls; p=NS). The number of non-prompted, diabetes related con-

TABLE II—*Baseline comparisons at start of study.* Results represent most recent values for each group before randomisation. Means are given for normally distributed data, median for skewed data*

	Control group	Prompted group	p Value
Mean age (years) (SD)	63·1 (8·6) [n=92]	62·0 (11·2) [n=89]	NS
Mean duration of diabetes mellitus (years) (SD)	7·1 (4·9) [n=91]	6·9 (5·0) [n=89]	NS
Median interval between last diabetic clinic attendance and randomisation (years) (range)	0·6 (0-2·0) [n=92]	0·6 (0-1·8) [n=89]	NS
No (%) of male patients	51/92 (55)	54/89 (61)	NS
No (%) of patients controlled by diet alone	26/92 (28)	23/89 (26)	NS
No (%) of patients controlled by diet plus hypoglycaemics	62/92 (67)	65/89 (73)	NS
Mean weight (kg) (SD)	75·2 (12·9) [n=83]	76·1 (14·5) [n=85]	NS
Mean random plasma glucose (mmol/l) (SD)	9·9 (4·1) [n=90]	9·6 (3·8) [n=88]	NS
Mean glycated haemoglobin (%) (SD)	10·3 (2·3) [n=41]	10·4 (2·5) [n=28]	NS
Mean systolic blood pressure (mm Hg) (SD)	153·6 (24·2) [n=86]	144·5 (22·0) [n=86]	0·011
Mean diastolic blood pressure (mm Hg) (SD)	84·3 (10·9) [n=86]	83·3 (11·5) [n=86]	NS
No (%) of patients without diabetic complications	33/92 (36)	39/86 (45)	NS
No (%) of patients with ischaemic heart disease	18/92 (20)	17/86 (20)	NS
No (%) of patients with neuropathy	25/92 (27)	20/86 (23)	NS
No (%) of patients with leg ischaemia	4/92 (4)	14/86 (16)	0·017
Mean No of complications per patient (SD)	1·3 (1·2) [n=92]	1·1 (1·3) [n=86]	NS

*Information on all variables not available for 100% of each group.
Statistical tests were two tailed *t* test for continuous variables and χ^2 test for proportions (with continuity correction).

TABLE III—*Prompting system process measures*

	No of prompts issued	No of prompted actions completed	% Compliance rate
Blood and urine tests (n=89)	333	296	89
General practitioner clinical review (n=89)	296	275	93
Eye review (n=74)*	145	125	86

*Remaining 15 patients attended hospital eye clinic from start of study.

TABLE IV—*Process of care measures in patients reviewed at least once during study period. Means are given for normally distributed data*

	Control group	Prompted group	p Value
No (%) of patients without doctor diabetes review	14/92 (15·2)	3/89 (3·4)	0·013
Mean duration of study (years) (SD) for patients with one or more reviews	2·0 (0·6) [n=78]	1·7 (0·7) [n=86]	0·005
Mean No of doctor diabetes reviews per patient per year (SD)	2·4 (1·3)	3·0 (3·8)	NS
Mean No of diabetes reviews per patient per doctor (SD)	2·2 (2·0)	3·2 (1·9)	<0·001
Mean No of urine tests for albumin per patient per year (SD)	2·3 (1·4)	3·0 (4·5)	0·03
Mean No of plasma glucose estimations per patient per year (SD)	2·3 (1·4)	3·1 (4·5)	0·003
Mean No of glycated haemoglobin estimations per patient per year (SD)	0·9 (0·9)	2·4 (3·8)	<0·001
No (%) of patients referred to dietitian	32/78 (41)	29/86 (34)	NS
No (%) of patients referred to chiropodist	10/78 (13)	7/86 (8)	NS

Statistical tests were two tailed *t* test for duration. Mann-Whitney test for rates (adjusted for ties), and χ^2 test for proportions (with continuity correction).

TABLE V—*Numbers of structured clinical reviews of diabetes per patient during study period. Values are means (SD)*

Place of review	Control group (n=78)	Prompted group (n=86)	p Value
Hospital diabetic clinic	4·2 (2·7)*	1·6 (2·2)	<0·0001
General practice	0	3·2 (1·7)†	<0·0001
Total	4·2 (2·7)	4·8 (2·2)	NS

*In control group all reviews were done in hospital.
†In prompted group 67% of reviews were done in general practice.

TABLE VI—*Medical outcome. Results represent values nearest end of study (31 October 1990). Means are given for normally distributed data*

	Control group	Prompted group	p Value
Mean random plasma glucose (mmol/l) (SD)	11·2 (4·2) [n=77]	11·2 (4·2) [n=82]	NS
Mean glycated haemoglobin (%) (SD)	10·6 (2·5) [n=81]	10·3 (2·3) [n=85]	NS
Mean of each patient's mean glycated haemoglobin since randomisation (%) (SD)	10·6 (2·4)*	10·0 (2·0)†	NS
Total No of treatment category changes start to finish	13 (34·7)	14	NS
No (%) of patients switching from diet to oral hypoglycaemics	8/23 (35)	10/23 (43)	NS
No (%) of patients switching from diet to insulin	1/23 (4)	2/23 (9)	NS
No (%) of patients switching from oral hypoglycaemics to insulin	4/55 (7·3)	2/63 (3)	NS
No (%) of patients who received hospital inpatient treatment			
Diabetes related	17/92 (18)	8/89 (9)	NS
Non-diabetes related	10/92 (11)	7/89 (8)	NS
No (%) of deaths	7/92 (8)	7/89 (8)	NS

*Based on 202 observations in 81 controls.
†Based on 296 observations in 85 patients in prompted group.
Statistical tests were two tailed *t* test for duration, Mann-Whitney test for rates (adjusted for ties), and χ^2 test for proportions (with continuity correction).

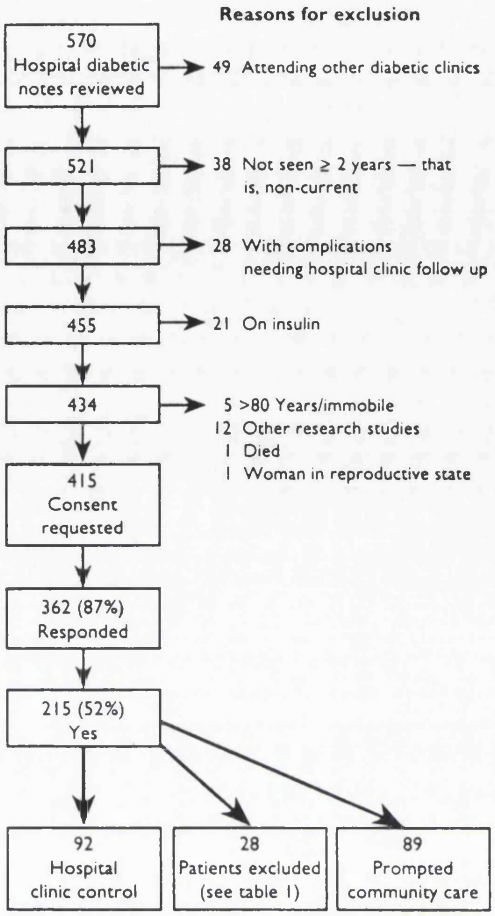


FIG 3—*Composition of study groups and reasons for exclusion from study*

sultations with general practitioners also showed no significant difference between the two groups.

A total of 52 (58%) prompted patients received 139 hospital clinic reviews during the study. Participating general practitioners referred 28 (31%) patients; and the database referred three (3·4%) on account of high blood glucose concentrations. Five (6%) prompted patients changed their minds about accepting prompting and were subsequently transferred back to hospital outpatients. The remaining 16 (18%) patients were referred by other hospital clinics, after inpatient episodes, or appeared to have referred themselves. The number of structured clinical assessments per patient by location of care for each group is shown in table V. During the study period the frequency of structured review was comparable in the two groups. In the control group all occurred in hospital diabetic clinics whereas for the prompted group 67% occurred in general practice. When process of care measures were reanalysed after excluding the 21 patients who were referred back to the hospital clinic other than through the prompting system, all process of care measures in table IV remained more frequent in the prompted subgroup (n=65 prompted subjects).

MEDICAL OUTCOME

By the end of the study there were no differences between the groups in the means of the last recorded random plasma glucose and glycated haemoglobin concentrations, though mean random plasma glucose values had risen from baseline by 1·3 mmol/l and 1·6 mmol/l in control and prompted groups respectively (table VI). An additional measure of glycaemic control was provided by looking at the mean of all the

Box 2

Patient questionnaire

Section 3: diabetic review by general practitioner

Review of your diabetes occurs in general practice soon after you receive the record with the results of blood and urine tests.

(1) In your opinion, does the doctor who usually reviews your diabetes apply the same standard of blood sugar control as the hospital doctor?

	Response (%)	n=39
Yes	56	
No	10	
Don't know	28	
Unanswered	5	

(2) Do you feel that the general practitioner makes a thorough assessment of your diabetes?

	Response (%)	n=39
Very thorough assessment	33	
Thorough assessment	23	
Adequate assessment	31	
Poor assessment	8	
Very poor assessment	0	
Unanswered	5	

(3) Do you trust the general practitioner to monitor your diabetes as well as or better than the hospital doctor?

	Response (%)	n=39
Better than the hospital clinic	8	
As well as the hospital clinic	82	
Worse than the hospital clinic	8	
Unanswered	3	

Section 4: community diabetic eye care

Once a year you receive a reminder to have an eye test, together with a map of those optometrists who have a particular interest in diabetic eye problems.

(1) Did the last optometrist to check your eyes for diabetic eye problems put drops in your eyes before examining them?

	Response (%)	n=29
Yes	52	
No	24	
Don't know	24	
Unanswered	0	

(2) In your opinion, is the eye test by an optometrist:

	Response (%)	n=29
Better than the eye check up in the hospital clinic?	31	
As good as the eye check up in the hospital clinic?	48	
Worse than the eye check up in the hospital clinic?	3	
Unanswered	17	

(3) Overall, are these arrangements for your eye check ups in the community:

	Response (%)	n=29
Very acceptable?	45	
Acceptable?	52	
Unacceptable?	0	
Very unacceptable?	0	
Unanswered	3	

glycated haemoglobin results for each patient since the date of randomisation and then calculating the mean of means for each group. This also showed no significant difference between control and prompted patients.

Changes in diabetes treatment categories—for example, diet to oral hypoglycaemics or insulin—the number of patients admitted to hospital for diabetes related reasons, and mortality were similar or identical in the two groups (table VI).

EYES

At the start of the study 70 patients in the control group and 74 in the prompted group were not currently attending a hospital eye clinic. There was no significant difference in the proportion of each group noted to show evidence of cataract, previous cataract extraction, or diabetic retinopathy (table VII). During the study period 12 controls and two prompted patients did not receive either hospital outpatient eye examination or optometry screening (p=0·008). The prompted group received on average 1·1 eye examinations per year compared with 0·9 in the control group (NS). There was no significant difference in the number of patients referred to hospital eye clinics. The number of cataracts newly recorded by optometrists in the prompted group exceeded that recorded by doctors in the hospital clinic group (29 *v* 3; p<0·001) but there was no difference in the recorded rate of diabetic retinopathy in the two groups.

ACCEPTABILITY

High compliance levels suggested acceptability of the scheme to all groups involved. More detailed responses were sought by means of questionnaires. The response to the patient questionnaire was 93% (39/42), and a sample of their responses is shown in box 2. Thirty two patients (82%) judged prompted community care, as a whole, to be as good as their former hospital clinic care.

All doctors (n=48) in the participating practices who had performed two or more prompted clinical reviews by May 1989 were also sent a questionnaire of 24 question stems, of which seven are reproduced in box 3; 31 general practitioners (65%) responded. Clinical assessments were estimated to take on average 9·8 minutes for a regular review and 13·4 minutes for an annual review. The general practitioners scored this method of care 4·3 on average, on a scale "very poor" (score 1) to "excellent" (score 5). Their confidence in providing care within this framework averaged 4 on the same scale, all but three of the doctors indicating that this method of care interfaced well with their primary health care practice. Despite the absence of a consensus on who had clinical responsibility for the patients in this scheme—general practitioner, hospital, or both—28 of the 31 general practitioners wished to continue providing diabetic care within this framework. Most of the responding general practitioners wanted more of their patients included within the prompting scheme.

The views of participating optometrists were also sought.[22] Eleven optometrists working in 15 different locations were visited and interviewed with a structured questionnaire. All expressed satisfaction with the working of the prompting scheme and 10 wanted more patients to be included. Besides performing refraction and examinations of the media of each eye all the optometrists reported that they had dilated the pupils of the prompted patients. All had access to a tonometer. All expressed satisfaction with the design of the optometry clinical review form.

Discussion

This study has shown that with a prompting system diabetic care comparable to that of a hospital diabetic clinic can be provided in small inner city practices, and with a lower lost to follow up rate. Compliance of doctors and patients proved high and the system as a whole was widely acceptable. The lower default rate in the community group is particularly important because loss to follow up carries an increased risk of diabetic complications, especially in non-insulin treated patients.[23]

The approach adopted in Islington could have wide applicability. Of the 570 patients whose hospital notes were reviewed before the study, 415 (73%) were judged by generally accepted criteria to be medically suitable for community care.

Though process of care measures may be an imperfect guide to the standard of patient care because of differences in the knowledge and skills of health carers in their different settings, we believe that our results are a very considerable improvement on those of previous British studies. In the Cardiff trial 14% of community care patients received regular general

practitioner review and only 5% received yearly blood glucose estimations.[2] In Kirkcaldy only two thirds of patients received a diabetes review by their general practitioner in the first or second year of a two year study and only 50% had annual blood glucose assessments.[24] In a non-randomised study in Ipswich among a group of 209 diabetics discharged to general practitioner care with agreed standards of medical follow up only 25% of patients had had their urine tested or blood glucose value estimated by their general practitioner in the previous two years.[1] Prompting in Islington also ensured very high levels of specific diabetes assessments, comparing favourably with the most comprehensive levels of care reported from hospital clinics and from general practitioner miniclinic care.[12 24-26]

TABLE VII—*Baseline process of care for eyes and outcome comparisons. Results represent most recent values for each group before randomisation for baseline comparisons and nearest end of study for outcome comparisons*

	Control group	Prompted group	p Value
Initial baseline comparisons			
Entire groups:			
No (%) of patients attending hospital eye clinic	22/92 (24)	15/89 (17)	NS
Non-hospital eye clinic attenders:			
No (%) of patients with cataract or past extraction of cataract	7/70 (10)	4/74 (5)	NS
No (%) of patients with non-sight threatening retinopathy	1/70 (1)	2/74 (3)	NS
Process of care in non-hospital eye clinic attenders			
No (%) of non-attenders	12/70 (17)	2/74 (3)	0·008
Patients who attended:			
Mean No of eye examinations per patient per year (SD)	0·9 (0·75)	1·1 (0·78)	NS
No (%) of patients referred to hospital eye clinic during study	11/58 (19)	7/72 (10)	NS
Outcome			
No (%) of patients with new cataract or cataract extraction during study	3/58 (5)	29/72 (40)	<0·001
No (%) of patients with new non-sight threatening retinopathy during study	2/58 (4)	2/72 (3)	NS
No (%) of patients with new sight threatening retinopathy during study	5/58 (9)	2/72 (3)	NS

Statistical tests were Mann-Witney test for rates (adjusted for ties) and χ^2 test for proportions (with continuity correction).

Box 3

General practitioner questionnaire **n=31**

(1) Is the prompting system a satisfactory method of organisation for supporting the clinical care of non-insulin dependent diabetic patients in your practice?

	Very poor				Excellent	Mean score
Scale	1	2	3	4	5	4·3
Response (%)		10	7	32	52	

(2) How confident do you feel about providing clinical care to these patients using this system?

	Not at all confident				Very confident	Mean score
Scale	1	2	3	4	5	4·0
Response (%)	3		7	48	55	

(3) Are the clinical review forms in use:

	Useless?				Useful?	Mean score
Scale	1	2	3	4	5	4·0
	Too simple?				Too complex?	
	1	2	3	4	5	2·9
	Provide too little space?			Provide too much space?		
	1	2	3	4	5	2·9

(4) Does seeing a diabetic patient for clinical review disrupt your surgery to any appreciable extent?

	A great deal				Not at all	Mean score
Scale	1	2	3	4	5	4·3
Response (%)	0	10	23	29	39	

(5) How long does it take to complete:

	Mean
An annual review assessment?	13·4 min
A regular review assessment?	9·8 min
(1 Unanswered)	

(6) In the current system who do you feel takes clinical responsibility for these prompted patients?

	General practitioner	Hospital	Both	Don't know
Response	26%	10%	55%	10%

(7) Would you be prepared to have more patients attending your surgery for their diabetic care within this framework?

	Yes	No	Undecided
Response	76%	4%	20%

NEED FOR EASY AND APPROPRIATE REFERRAL

A third of all structured diabetes reviews in the prompted group occurred in hospital outpatients but this does not detract from the effectiveness of the prompted care package as a whole. Though 21 of 52 (40%) of these referrals were not made by participating general practitioners and a proportion may have constituted unnecessary duplication of care, most were referred appropriately as part of the shared care arrangements. Effective community care must provide a mechanism which allows easy and appropriate referral to and from hospital clinics. Prompted care in Islington successfully supported a shift of two thirds of the burden of care from hospital clinic to community setting over two and a half years.

Mean plasma glucose and glycated haemoglobin values, unlike complication rates, are not subject to observer error and provide useful proxy measures of outcome. Our results are in keeping with findings from Wolverhampton, where in a non-randomised trial of discharge to general practitioner miniclinic care of patients with both insulin treated and non-insulin treated diabetes there was no loss of glycaemic control. They contrast, however, with findings from the Cardiff trial, where the available measures of glycated haemoglobin indicated worse glycaemic control in the community care group at the end of the study, although there were no prerandomisation glycated haemoglobin measurements.[2] Previous studies have noted a higher mortality in the community group,[2 24] but this was not the case in Islington.

Responsibility for retinal screening lay with optometrists unless the patient was already under the care of a hospital eye clinic. After allowing for the much higher non-attendance rate in controls, the annual rate of eye examination per patient and the number of patients referred to a hospital ophthalmic clinic were comparable in the two groups. The larger number of cataracts recorded in the prompted group probably reflects the diligence of optometrists in noting these defects, compared with doctors in the hospital diabetic clinic. It is recognised that without standardisation and training of the optometrists and doctors involved such measures, together with those of recorded retinopathy, are "soft" measures of outcome.

WILLINGNESS OF GPS TO PARTICIPATE

Despite financial inducements provided by the general practitioner contract and a doubling in the number of nurses working with participating practices in the past two years, few local general practitioners wish to establish miniclinics. General practitioners in Camden and Islington make only half the national annual average of clinic payment claims to the family health services authority. This study has shown that an acceptable standard of diabetic care can be provided in normal surgery time. Structured prompting of community care allows "protected review" in normal surgeries rather than requiring "protected time" in specially designated miniclinics.[27 28] However, the degree of uncertainty concerning overall clinical responsibility for prompted patients revealed by the general practitioner questionnaire needs to be carefully addressed.

Organisational and clinical guidelines embedded in the Islington prompting system may be varied and developed as standards of good practice evolve or

as new resources become available locally.[29] For example, a number of future enhancements are already envisaged involving the inclusion of ideal body weight on the general practitioner review forms and an option for general practitioners to request review by a diabetes education nurse. Requests for intraocular pressure measurement may be added to the optical review forms. In July 1993 payments to general practitioners for disease management clinics will stop completely. In the case of non-insulin treated patients the health care objectives which practices will then have to meet in order to qualify for diabetic care payments could be met by prompting structured care as in Islington. Expansion of this pilot scheme into a district service is planned.

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1 Day JH, Humphreys SH, Alban-Davies H. Problems of comprehensive shared diabetes care. *BMJ* 1987;294:1590-2.
2 Hayes TM, Harries J. Randomised controlled trial of routine hospital care versus routine general practice care for type II diabetics. *BMJ* 1984;289: 728-30.
3 Singh BM, Holland MR, Thorn PA. Metabolic control of diabetes in general practice clinics: comparison with a hospital clinic. *BMJ* 1984;289:726-8.
4 Malins JM, Stuart JM. Diabetic clinic in a general practice. *BMJ* 1971;iv:161.
5 Thorn PA, Russell RG. Diabetic clinics today and tomorrow: miniclinics in general practice. *BMJ* 1973;ii:534-6.
6 Doney BJ. An audit of the care of diabetes in a group practice. *J R Coll Gen Pract* 1976;26:734-42.
7 Hill RD. Community care service for diabetics in the Poole area. *BMJ* 1976;i:1137-9.
8 Dornan C, Fowler G, Mann JL, Markus A, Thorogood MA. A community study of diabetes in Oxfordshire. *J R Coll Gen Pract* 1983;33:151-5.
9 Wilkes E, Lawton EE. The diabetic, the hospital and primary care. *J R Coll Gen Pract* 1980;30:199-206.
10 Waine C. *Why not care for your diabetic patients?* London: Royal College of General Practitioners, 1986.
11 Tasker PRW. Is diabetes a disease for general practice? *Practical Diabetes* 1984;1:21-4.
12 Williams DRR, Munroe C, Hospedales CJ, Greenwood RH. A three-year evaluation of the quality of diabetes care in the Norwich community care scheme. *Diabetic Med* 1989;7:74-9.
13 Kopelman P, Keable-Elliott D. An inner city district diabetic care scheme. *Diabetic Med* 1990;8:558-61.
14 Burns-Cox CJ, Dean Hart JC. Screening of diabetics for retinopathy by ophthalmic opticians. *BMJ* 1985;290:1052-4.
15 Hill RD. Screening for diabetic retinopathy at primary health care level. *Diabetologia* 1981;20:670.
16 Buxton MJ, Sculpher MJ, Ferguson BA, Humphreys JE, Altman JFB, Spiegelhalter DJ, *et al.* Screening for treatable diabetic retinopathy: a comparison of different methods. *Diabetic Med* 1991;8:371-7.
17 Finlay R, Griffiths J, Johnson G, Law D. Can general practitioners screen their own patients for diabetic retinopathy? *Health Trends* 1991;23:104-5.
18 Sculpher MJ, Buxton MJ, Ferguson BA, Humphreys JE, Altman JFB, Spiegelhalter DJ, *et al.* A relative cost-effectiveness analysis of different methods of screening for diabetic retinopathy. *Diabetic Med* 1991;8:644-50.
19 Rohan TE, Frost CD, Wald NJ. Prevention of blindness by screening for diabetic retinopathy: a quantitive assessment. *BMJ* 1989;299:1198-201.
20 Kritzinger EE, Taylor KG. *Diabetic eye disease, an illustrated guide to diagnosis and management.* Lancaster: MTP Press, 1984.
21 Lindley DV, Scott WF. *New Cambridge elementary statistical tables.* Cambridge: Cambridge University Press, 1984:table 27.
22 Yiannaki A. Optometric screening for diabetic retinopathy in the community (BSc dissertation). London: Department of Optometry and Visual Science, City University, 1989:149, appendices.
23 Hammersley MS, Holland MR, Walford S, Thorn PA. What happens to defaulters from a diabetic clinic? *BMJ* 1985;291:1330-2.
24 Porter AMD. *The Kirkcaldy community care project.* Edinburgh: Department of General Practice, University of Edinburgh, 1979:75, appendices.
25 Kemple TJ, Hayter SR. Audit of diabetes in general practice. *BMJ* 1991;302:451-3.
26 Yudkin JS, Boucher BJ, Schopflin KE, Harris BJ, Clagg HR, Whyte NJD, *et al.* The quality of diabetic care in a London health district. *J Epidemiol Community Health* 1980;34:277-80.
27 Irving J, Casement S, Holme Q. A 'non-clinic' system of care for non-insulin-dependent diabetics in general practice. *Practical Diabetes* 1988;51:125-8.
28 Foulkes A, Kinmonth A, Frost S, MacDonald A. Organised personal care—an effective choice for managing diabetes in general practice. *J R Coll Gen Pract* 1989;39:444-7.
29 Haines A, Feder G. Guidance on guidelines. *BMJ* 1992;305:785-6.

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Bibliography

Bibliography

Acheson ED (1968) Record Linkage in Medicine. E & S Livingstone, Edinburgh.

[Acheson ED] (1981) Primary Health Care in Inner London. London Health Planning Consortium, London.

Acheson ED (1986) Variations in hospital referrals. In: Teeling Smith G ed. Health Education and General Practice. Office of Health Economics, London.

Anonymous (1976) Moving towards clinical integration. Editorial *Br Med J* 2, 964.

Anonymous (1979) Care of the diabetic: the hospital and the GP. *Drug & Ther Bull* 17, iv, 15-16.

Anonymous (1981) 'Always on a Tuesday'. *Health and Social Services J*, 960-61.

Anonymous (1983) Open letter to the new CMO. Editorial, *Br Med J* 287, 1903-5.

Baksi AK, Brand J, Nicholas M, Tavabie A, Cartwight BJ and Waterfield MR (1984) Non-consultant peripheral clinics: a new approach to diabetic care. *Health Trends* 16, 38-40.

Baldwin RN, Greaves J and Lorrains JW (1989) Successful outcome of a computerised comprehensive diabetic shared care scheme. *Diab Med* 6, p41.

Beardshaw V (1992) Tomlinson reports on London. Editorial, *Br Med J* 305, 1039-40.

Beilin LJ, Bulpitt CJ, Coles EC, Dollery CT and Johnson BF et al (1974) Computer-based hypertension clinic records: a co-operative study. *Br Med J* 279 ii, 212-26.

Bhopal RS and Hedley AJ (1985) Screening of diabetics for retinopathy by ophthalmic opticians. *Br Med J* 290, 1589.

Bosanquet N (1987) The Outlook For General Practice in Kensington and Chelsea and Westminster. Kensington and Chelsea and Westminster Family Practitioner Committee, London.

Brahams D (1992) Medicine and the law: eye monitoring in diabetes. *Lancet* 339, 863-4.

Bradlow J, Coulter A and Brooks P (1992) Patterns of referral. University of Oxford Health Services Research Unit, Oxford.

British Diabetic Association (1990a) Guidelines for the Development and Integration of General Practitioner Care of Diabetes with Hospital Based Systems. British Diabetic Association, London.

British Diabetic Association (1990b) What Diabetic Care to Expect. British Diabetic Association, London.

British Diabetic Association (1991) What Professional Supervision Should Children with Diabetes and their Families Expect?. British Diabetic Association, London.

British Diabetic Association (1992) The BDA - Helping people live with diabetes. British Diabetic Association, London.

Bron AJ (1985) Screening for treatable diabetic retinopathy. *Br Med J* 290, 1025-6.

Bulpitt CJ, Beilin LJ, Coles EC, Dollery CT and Johnson BF et al (1976) Randomised controlled trial of computer-held medical records in hypertensive patients. *Br Med J* 281 i, 677-79.

Burnett SD, Woolf CM and Yudkin JS (1992) Developing a district diabetic register. *Br Med J* 305, 627-630.

Burns-Cox CJ and Dean Hart JC (1985) Screening of diabetics for retinopathy by ophthalmic opticians. *Br Med J* 290, 1052-4.

Burr B (1990) Organising a hospital clinic and diabetic records. In: Tattersall RB and Gale EAM eds. Diabetes Clinical Management. Churchill Livingstone, Edinburgh 99-109.

Burrows PJ, Gray PJ, Kinmonth A-L, Payton DJ, and Walpole GA et al (1987) Who cares for the patient with diabetes? Presentation and follow-up in seven Southampton practices. *J Roy Coll Gen Pract* 37, 65-69.

Buxton MJ, Sculpher MJ, Ferguson BA, Humphreys JE, Altman JFB et al (1991) Screening for treatable diabetic retinopathy: a comparison of different methods. *Diab Med* 8, 371-77.

Cahil GF, Etzwiler DD and Freinkel N (1976) 'Control' and diabetes. *N Eng J Med* 294, 1004-05.

Callaway PL, Kinmonth AL and Leatherdale (1988) A team approach to developing a district diabetic service. *Diab Med* 687-90.

Cartwright A (1967) Patients and their Doctors. Routledge and Kegan Paul, London.

Cartwright A and Anderson R (1981) General Practice Revisted: A Second Study of Patients and Their Doctors. Tavistock, London.

Child DF and Williams CP (1982) Audit in a diabetic clinic. *J Roy Soc Med* 75, 399-403.

Cochrane AL (1972) Effectiveness and Efficiency: Random Reflections on Health Services. Nuffield Provincial Hospitals Trust, Oxford.

Cox IG (1983) Treating diabetes & dementia. *Br Med J* 287, 1031-2.

Davidson SI and Parker J (1987) Regular diabetic review in surgery time. *Practitioner* 231, 1532-4.

Day JL (1980) The organisation of diabetic care. *Hospital Update* 1177-83.

Day JL, Humphreys SH and Alban-Davies H (1987) Problems of comprehensive shared diabetes care. *Br Med J* 294, 1590-2.

Day JL and Spathis M (1988) District diabetes centres in the United Kingdom. *Diab Med* 5, 372-80.

Doney BJ (1976) An audit of the care of diabetes in a group practice. *J R Coll Gen Pract* 26, 734-42.

Dornan C, Fowler G, Mann JI, Markus A and Thorogood MA (1983) A community study of diabetes in Oxfordshire. *J R Coll Gen Pract* 33, 151-5.

Elliott A (1983) Report of General Practice Facilitator. North East Thames Regional Health Authority, London.

Engerman R, Bloodworth JMB and Nelson S (1977) Relationship of microvascular disease in diabetes to metabolic control. *Diabetes* 26, 760-69.

Eschwege E (1979) Delayed progression of diabetic retinopathy by divided insulin administration: a further follow-up. *Diabetologia* 16, 13-15.

Exeter University (1987) Diabetic Record Cards *DRC1, 2 & 3*. Department of General Practice, University of Exeter.

Fairley R (1984) A local shared care scheme for diabetic patients. *Update* 28, 711-14.

Family Health Sevices Computer Unit (1992) Diabetes Care System - User Requirements. FHS Computer Unit, Bromsgrove, Worcestershire.

Farmer A and Coulter A (1990) Organisation of care for diabetic patients in general practice: influence on hospital admissions. *Br J Gen Pract* 40, 56-8.

Featherstone PI, James C, Hall MS and Williams A (1992) General practitioners' confidence in diagnosing and manageing eye conditions: a survey in south Devon. *Br J Gen Pract* 42, 21-24.

Finlay R, Griffiths J, Jackson G and Law D (1991) Can general practitioners screen their own patients for diabetic retinopathy? Health Trends 23 iii, 104-5.

Fleming PC (1985) What is happening to our diabetic patients? An audit of care in general practice. *Prac Diab* 2, 26-29.

Fletcher BR (1977) Looking after diabetics in general practice: a trainee project. *J R Coll Gen Pract* 27, 85-88.

Foulds WS, McCuish A, Barrie T, Green F, Scobie IN et al (1983) Diabetic retinopathy in the West of Scotland: its detection and prevalence and the cost effectiveness of a proposed screening programme. *Health Bulletin* 41, 318-26.

Foulkes A, Kinmonth AL, Frost S and MacDonald D (1989) Organised personal care - an effective choice for managing diabetes in general practice. *J R Coll Gen Pract* 39, 444-47.

Fuller J (1983) Clinical trials in diabetes mellitus: In: Mann JI, Pyorala K and Tenscher A eds: Diabetes in Epidemiological Perspective. Churchill Livingstone, Edinburgh.

Gatling W, Mullee M and Hill RD (1986) Shared diabetic care in practice. *Diab Med* 3, p76.

Gibbins RL, Saunders J, Rowlands CJ, Harding-Dempster J and Cavenagh AJM (1983) Does home monitoring of blood glucose work in general practice? *Br Med J* 287, 801-4.

Gibbins RL, Rowlands CJ and Saunders J (1986) A management system for diabetes in general practice. *Diab Med* 3, 477-80.

Gillies-Reyburn H and Murtomaa M (1981) The Prevention of Blindness amongst Diabetics. Report on Field Service Attachment, London School of Hygiene & Tropical Medicine, London.

Golden WE and Friedlander IR (1987) Inverse Technology and medical education. *Lancet* i, 851-3.

Hall R, Roberts CJ, Coles GA, Fisher DJ, Fowkes FGR et al (1988) The impact of guidelines in clinical outpatient practice. *J Roy Coll Physicians Lond* 22, 244-7.

Hammersley MS, Holland MR, Walford S & Thorn PA (1985) What happens to defaulters from a diabetic clinic? *Br Med J* 291, 1330-32.

Harkness J (1962) Prevalance of diabetes mellitus: a comprehensive survey in an urban community. Br Med J i, 1503-07.

Harrison CJ, Roaf EJ, Boulton AJM and Tomlinson S (1992) An audit of patient satisfaction. *Pract Diab* 9, 107-10.

Hart J T (1970) Semicontinuous screening of a whole community for hypertension, *Lancet* ii, 223-6.

Hart JT (1974) The marriage of primary care and epidemiology. *J Roy Coll Phys Lond* 8, 299-314.

Hart JT (1976) General practice workload, needs, and resources in the National Health Service. *J R Coll Gen Pract* 26, 885-92.

Hart JT (1986) Community general practitioners. *Br Med J* 288, 1670-73.

Harvey RD, Naji SA, Murchison LEM, Pearson DWP, Williams MJ et al (1992) A randomised controlled trial of a system of shared care for diabetes between hospital clinics and general practitioners compared with traditional hospital based care. *Diab Med* 9, p85.

Hayes TM and Harries J (1978) Who should care for diabetics? Interim results of the Cardiff randomised discharge study. Abstract. British Diabetic Association, Scientific Section.

Hayes TM and Harries J (1984) Randomised controlled trial of GP v clinic care for Type II diabetics. Abstract. British Diabetic Association, Scientific Section.

Hayes TM and Harries J (1984) Randomised controlled trial of routine hospital clinic care versus routine general practice care for type II diabetics. *Br Med J* 289, 728-30.

Hicks D (1976) Primary Health Care: A Review. HMSO, London.

Hill RD (1976a) Community care service for diabetics in the Poole area. *Br Med J* i, 1137-39.

Hill RD (1976b) Running a diabetic clinic. *Br J Hosp Med* 16, 218-226.

Hill RD (1978) Shared care for diabetics. *Update* 20, 1339-45.

Hill RD (1981) Screening for diabetic retinopathy at primary health care level. *Diabetologia* 20, 670.

Hill RD (1983) The Community Care Service For Diabetics in the Poole Area. Poole 14pp.

Hill RD (1986) Diabetes and the computer. *Pract Diab* 3, 235-7; 290-2.

Hill RD (1987) Diabetes Health Care. Chapman & Hall, London.

Hill RD and Upton CE (1981) Care of the diabetic in the community. *Medicine* 8, 105-7.

Holme P and Walford S (1984) Diabetes care: whose responsibility? *Br Med J* 289, 713-4.

Honigsbaum F (1979) The Division in British Medicine. Kogan Page, London.

Huntington J, Irvine S and Marinker M (c. 1986) Management in Practice. Video & Course Book, produced by the MSD Foundation for the Royal College of General Practitioners, London.

Hurwitz B (1983) What are the pertinent issues underlying the current debate over diabetic health care delivery? Msc dissertation. University of London.

Hurwitz B (1984) Personal Diabetic Record Card. Islington Shared Care Scheme, Whittington Hospital 1984. Reprinted Royal College of General Practitioners, London, 1986, 1988.

Hurwitz B (1986) Diabetes: A Model For Chronic Disease. Video & Course Book, Programme 101/1. MSD Foundation, London.

Hurwitz B (1987) Getting started on diabetic care. *Practitioner* 231, 1525-31.

Hurwitz B, Goodman C and Yudkin JS (1993) Prompting the clinical care of non-insulin dependent (type II) diabetic patients in an inner city area: one model of community care. *Br Med J* 306, 624-30.

Hurwitz B and Richardson R (1987) The Islington Personal Diabetic Record Card. Islington Shared Care Scheme, Whittington Hospital, London.

Hurwitz B, Solomonides AE and Yudkin JS (1987) A diabetic data base and prompting system to improve community care. *Diab Med* 4, p357.

Hurwitz B and Yudkin JS (1984) Diabetes Care: whose responsibility? *Br Med J* 289, 1000-1001.

Hurwitz B and Yudkin JS (1990) Shared care. In: Tattersall RB and Gale EAM eds. Diabetes Clinical Management. Churchill Livingstone, Edinburgh.

Hurwitz B, Yudkin JS and Hyland K (1992) Diabetes mellitus. In: Haines A and Hurwitz B eds. Clinical Guidelines: report of a local initiative. Occasional Paper 58, Royal College of General Practitioners, London.

International Diabetes Federation and St Vincent Declaration Steering Committee of WHO Europe (1991) The European Patients' Charter. Diab Med 8, 782-3.

Irving JMR, Casement SM and Holme Q (1988) A 'no-clinic' system of care for non-insulin-dependent diabetics in general practice. *Pract Diab* 5, 125-8.

Islington Health Authority (1982) Population Estimates and Projections. Planning Department, Islington health Authority, London.

Islington Health Authority (1983) Population Estimates and Projections. Planning Department, Islington health Authority, London.

Islington Health Authority (1988) Islington Health Authority District Profile. Islington health Authority, London.

Jarman B (1978) Medical Problems in inner London. *J R Coll Gen Pract* 28, 598-602.

Jarman B (1981) A Survey of Primary Care in London. Occasional Paper 16, Royal College of General Practitioners, London.

Jarrett RJ and Keen H (1976) Hyperglycaemia and diabetes mellitus. *Lancet* i, 1009-12.

Jarrett J (1983) Microvascular disease in diabetes mellitus: In: Mann JI, Pyorala K and Tenscher A eds: Diabetes in Epidemiological Perspective. Churchill Livingstone, Edinburgh.

Jones RB, Hedley AJ, Peacock I, Allison SP and Tattersall RB (1983) A computer assisted register and information system for diabetes. *Meth Inf Med* 22, 4-14.

Jones SJ, Hedley AJ, Curtis B, Allison SP and Woolfson AMJ (1982) Do we need thyroid follow-up registers? *Lancet* i, 1229-1232.

Jones SJ, Hedley AJ, Young RE, Dinwoodie DL and Bewsher PD (1981) 'Lost to follow-up': reasons for discontinued surveillance in a follow-up register. *Com Med* 3, 25-30.

Judd SL, O'Leary E, Read P and Fox C (1976) The changing role of nurses in the management of diabetes. *Br J Hosp Med* 16, 251-4.

Kemple TJ, Hayter SR (1991) Audit of diabetes in general practice. *Br Med J* 302, 451-3.

Kenny AJ and Chute AL (1953) Diabetes in two Ontario communities. *Diabetes* 2, 187.

Kenny AJ, Chute AL and Best CH (1951) A study of the prevalence of diabetes in an Ontario community. *Can Med Ass J* 65, 233-41.

Kinmonth A-L, Murphy E, Marteau T (1989) Diabetes and its care -what do patients expect? *J R Coll Gen Pract* 39, 324-27.

King's Fund Commission (1992) London Health Care 2010: Changing the Future of Services in the Capital. King's Fund, London.

Kopelman P and Keable-Elliott D (1990) An inner city district diabetic care scheme. *Diab Med* 8, 558-61.

Kopelman P, Michell JC, Derrett CJ, Keast R and Sanderson A (1992) A computerised system (DIASHARE) for the management and evaluation of diabetic care. Abstract. *Diab Med* 9, p84.

Koperski M (1987) The diabetic day. A model for the management of chronic illness in general practice. *Practitioner* 231, 1537-39.

Kratky AP (1977) An audit of the care of diabetics in one general practice. *J R Coll Gen Pract* 27, 536-543.

Kritzinger EE and Taylor KG (1984) Diabetic Eye Disease. MTP Press, Lancaster.

Laing W and Williams DRR (1989) Diabetes: a Model for Health Care Management. Office of Health Economics, London.

Lawrence RD (1965) The Diabetic Life. J & A Churchill, London [1st edition 1925].

Leese GP, Ahmed S. Newton RW, Jung RT, Ellingford A et al (1993) Use of mobile screening unit for diabetic retinopathy in rural and urban areas. *Br Med J* 306, 187-9.

Ling P, Lovesay JM, Mayon-White VA, Knight AH (1985) The diabetic clinic dinosaur is dying: will diabetic day units evolve? *Diab Med* 2, 163-5.

McAlister NH, Covvey HD, Tong C, Lee A and Wigle ED (1986) Randomised control trial of computer assisted management of hypertension in primary care. *Br Med J* 293, 670-674.

MacCormack M (1976) Patient recall system. *Update* 12, 552.

MacDonald CJ (1976) Protocol-based computer reminders, the quality of care and the non-perfectablity of man. *N Eng J Med* 295, 1351-1355.

Main J and Main P (1990) Problematical models - targets and clinics. *J R Coll Gen Pract* 'Connection' supplement 21, 4-5.

Malins JM (1968) Clinical Diabetes Mellitus. Eyre & Spottiswoode, London.

Malins JM and Stuart JM (1971) Diabetic clinic in a general practice. *Br Med J* iv, 161.

Malone P (1982) Diabetes Mellitus in an Irish General Practice. *Irish Med J* 75, 116-118.

Marks L (1987) Primary Health Care on the Agenda? A Discussion Document. King's Fund Centre, London.

Meadows KA and Wise PH (1988) Questionnaire design in diabetes care and research. *Diab Med* 5, 699-704; ?2nd ref

Mellor JG, Samanta A, Blandford RL and Burden AC (1985) Questionnaire survey of diabetic care in general practice in Leicestershire. *Health Trends* 17, 61-63.

Ministry of Health (1953) National Health Service: Regional Planning of Diabetic Services. MoH, London.

Ministry of Health (1963) Regional Planning of Diabetic Services. MoH, London.

Moore AT and Roland M (1989) How much variation in referral rates among general practitioners is due to chance? *Br Med J* 298, 500-2.

Morris DV, Murray MAF and Kurtz AB (1984) A simple microcomputer clinical record system - report of first year's use. Abstract. *Diab Med* 147a.

Morris R and Roland M (1988) Are referrals by general practitioners influenced by the availability of consultants? *Br Med J* 297, 599-600.

Muir A, Howe-Davis SA and Turner R (1982) General Practice care of non-insulin-dependent diabetes with fasting blood glucose measurements. *Am J Med* 73, 637-40.

Murphy E, Kinmonth A-L and Marteau T (1992) General practice based diabetes surveillance: the views of patients. *Br J Gen Pract* 42, 279-83.

National Health Service Management Executive (1992) Health Promotion Clinic Claims Data. NHSME, Leeds.

National Health Service Management Executive (1993) GP Contract Health Promotion Package: Guidance on Implentation. In: British Medical Association GMSC (1993) The New Health Promotion Package, BMA, London.

National Morbidity Statistics from General Practice 1970-1; First National Study (1974). HMSO, London.

National Morbidity Statistics from General Practice 1971-2: Second National Study (1979). HMSO, London.

National Morbidity Statistics from General Practice 1981-2: Third National Study (1986). HMSO, London.

Osmundson PJ, O'Fallon WM, Zimmerman BR (1990) Course of peripheral occlusive arterial disease in diabetes: vascular laboratory assessment. *Diab Care* 13, 143-52.

Parnell SJ, Zalin AM and Clarke CWF (1993) Care of diabetic patients in hospital clinics and general practice clinics: a study in Dudley. *Br J Gen Pract* 43, 65-9.

Petrie JC, Robb OJ, Webster J Scott AK and Jeffers TA et al (1985) Computer assisted shared care in hypertension. *Br Med J* 290, 960-62.

Pietroni RG (1984) Diabetes care: whose responsibility? *Br Med J* 289, 1001.

Pirart J (1978) Diabetes mellitus and its degenerative complications: a prospective study of 4,400 patients observed between 1947 and 1973. *Diabetes Care* 1, 168-188, 252-265.

Pocock SJ (1983) Clinical Trials, A Practical Approach. John Wiley & Sons, Chichester.

Poole Diabetes Working Party (1972) Diabetic Cooperation Book. Poole Community Care Service & Hoechst Pharmaceuticals Ltd.

Porter AMD (1979) The Kirkcaldy Community Medical Care Project. Department of General Practice, University of Edinburgh.

Porter AMD (1982) Organisation of diabetic care. *Br Med J* 285, 1121.

Porter AMD and Robertson PD (1972) Diabetic Clinic Study. University of Edinburgh.

Pringle M, Stewart-Evans C, Coupland C, Williams I and Allison S et al (1993) Influences on control in diabetes mellitus: patient, doctor, practice, or delivery of care? *Br Med J* 306, 630-4.

Redhead IH (1960) The incidence of glycosuria and diabetes mellitus in a general practice. *Br Med J* i, 695-99.

Reith SBM (1985) A shared-care option in a semi-rural area. In: Shared Care in Diabetes, *Update* Postgraduate Series: 24-30.

Reith SBM (1985) Caring for diabetics in Central Scotland. Editorial, *Diab Med* 2, 417-24.

Rogers D, Bitner-Glindzicz M, Harris C and Yudkin (1990) Non-mydriatic retinal photography as a retinal screening service for general practitioners. *Diab Med* 7, 165-7.

Rohan TE, Frost CD and Wald NJ (1989a) Prevention of blindness by screening for diabetic retinopathy: a quantitative assessment. *Br Med J* 299, 1198-201.

Rohan TE, Kelleher CC and Cruickshank JK (1989b) Organisation of diabetic care in general practice: a survey in the Medical Research Council's General Practice Research Framework. *Diab Med* 6, p51.

Roland M and Coulter A (1992) Hospital Referrals. Oxford University Press, Oxford.

Royal College of General Practitioners (1970) Present State and Future Needs of General Practice. 2nd Edition. Reports from general practice No 13. Royal College of General Practitioners, London.

Royal College of General Practitioners (1976) Ten year follow-up report on Birmingham Diabetes Survey of 1961. *Br Med J* ii, 35-7.

Royal College of General Practitioners (1977) Evidence to the Royal Commission on the NHS. *J R Coll Gen Pract* 27, 197-206.

Royal College of Physicians of London (1977) The Medical Care of Patients with Diabetes, Royal College of Physicians, London.

Royal College of Physicians of London and British Diabetic Association (1984) The Provision of Medical Care for Adult Diabetic Patients in the United Kingdom. Royal College of Physicians, London.

Royal College of General Practitioners (1986) Diabetes, Information Pack. Royal College of General Practitioners, London.

Ruben LA (1976) Diabetes and the general practitioner. *Br J Hosp Med* 241-45.

Ruben LA (1985) The general practitioner's role in diabetic care. In: Shared Care in Diabetes. *Update* Postgraduate Series, 15-23.

Russell RG, Canney JC, Sim ISG, Hackett K and Tyler LE (1974) Diabetic clinics in general practice. *Update* 8, 945-54.

Saunders J and Ruben LA (1981) Diabetes - the St Thomas' district approach. *Update* 22, 793-804.

Scottish Home and Health Department (1971) Doctors in an Integrated Health Service: Report of Joint Working Party. HMSO, Edinburgh.

Scottish Home and Health Department, and Scottish Health Service Planning Council (1987) Report of the Working Group on the Management of Diabetes. HMSO, Edinburgh.

Sculpher MJ, Buxton MJ, Ferguson BA, Humphreys JE, Altman JFB et al (1991) A relative cost-effectiveness analysis of different methods of screening for diabetic retinopathy. *Diab Med* 8, 644-50.

Sharp CL (1964) Diabetes Survey in Bedford 1962. *Proc Roy Soc Med* 57, 193-95.

Sheldon MG (1982) Medical Audit in General Practice. Occasional Paper 20, Royal College of General Practitioners, London.

Shotliff K and Herbert L (1993) Diabetic patients' eyes must be examined: [Letter]. *Br Med J* 306, 1001.

Singh BM, Holland MR and Thorn PA (1984) Metabolic control of diabetes in general practice clinics: comparison with a hospital clinic. *Br Med J* 289, 726-28.

Smith AWM (1976) Diabetes. In: Syme J ed. Functional Integration of Patient Care, Conference Proceedings. Royal College of Physicians, Edinburgh.

Soler M and Jines RB (1993) Diabetic care in general practice: [Letter]. *Br Med J* 306, 1123.

Sonksen PH (1985) Who cares for the diabetic? In: Shared Care in Diabetes, *Update* Postgraduate Centre Series 4-9.

South East London Commissioning Agency (1992). Specification of Service for Diabetes Mellitus. London.

Stanley PH (1991) We don't have a computer. *Br Med J* 303, 971-2.

Stead J W and Jacob JSH (1992) Letter to the Editor. *Health Trends* 24 i,42.

Stewart WK and Robertson PC (1963) Detection of diabetes mellitus under population survey conditions. *Lancet* i, 184-87.

Stocking B (1987) The team approach to diabetes in general practice. *Practitioner* 231, 1574-77.

Tasker PRW (1984) Is diabetes a disease for general practice? *Pract Diab* 1, 21-4.

Tchobroutsky G (1978) Relation of diabetic control to development of microvascular complications. *Diabetologia* 15, 143-52.

Thorn PA (1971) On looking after diabetic patients - hospital clinic or practice mini-clinic. *Midland Med Rev* 7, 151-4.

Thorn PA (1983) Care for diabetics in the United Kingdom: In: Mann JI, Pyorala K and Tenscher A eds: Diabetes in Epidemiological Perspective. Churchill Livingstone, Edinburgh.

Thorn PA and Russell RG (1973) Diabetic clinics today and tomorrow: mini-clinics in general practice. *Br Med J* 2, 534-36.

Thorn PA, Hughes HV, Russell IR, Serhan E, Sim ISG and Walker C (1985) Diabetic clinics in general practice - our 12 years' experience. Shared Care in Diabetes. *Update* Postgraduate Centre Series, 9-15.

Tomlinson B (1992) Report of the Inquiry into London's Health Service, Medical Education and Research. HMSO, London.

Tomlinson S (1992) The aims of diabetes care. In: Lewin IG and Seymour CA eds: Current Themes in Diabetes Care. Royal College of Physicians, London, 7-14.

Tulloch AJ (1979) Integrated patient care. *Update* 19, 1105-10.

Tulloch AJ, Fowler GH, McMullan JJ and Spence JM (1975) Hospital discharge reports: content and design. *Br Med J* 4, 443-46.

Tunbridge RE (1953) Sociomedical aspects of diabetes mellitus. *Lancet* ii, 893-99.

Turner RC, Wavers LE and O'Brien K (1990) The effect of patient-carried reminder cards on the performance of health maintenance measures. *Arch Int Med* 645-7.

Waine C (1986) Why Not Care For Your Diabetic Patients? Royal College of General Practitioners, London.

Upton CE (1975) Diabetic community care. *Practitioner* 215, 83-7.

Vercoe S (1987) The detection of diabetic retinopathy in general practice. *Practitioner* 231, 263-66.

Walker JB (1953) Fieldwork of a diabetic clinic. *Lancet* ii,445-7.

Walker JB (1963) The function of a diabetic clinic. Royal Society of Health, *Proceedings* 35, 74-6.

Walker JB (1989) Chronicle of a Diabetic Service. British Diabetic Association, London.

Watkins PJ (1979) Should diabetic clinics be abolished? *World Medicine* 15, 6: 21-2.

Whittington Hospital (c. 1981) Notes for Staff on the Diabetic and Endocrine Unit. Whittington Hospital, London.

Wilkerson HL and Krall LP (1947) Diabetes in a New England Town. *J Amm Med Ass* 27, 209-216.

Wilkes E and Lawton EE (1980) The diabetic, the hospital and primary care. *J R Coll Gen Pract* 30, 199-206.

Wilkin D and Smith A (1987) Variation in general practitioners' referrals to consultants. *J R Coll Gen Pract* 37, 350-3.

Wilks J M (1973) Diabetes - a disease for general practice. *J R Coll Gen Pract* 23, 46-54.

Wilson C, Brown V, Morley V, Browne L and Evans T (1991) Camberwell Diabetes Shared Care Scheme, King's College School of Medicine, London.

Williams CD, Harvey FE and Sonksen PH (1988) A role for computers in diabetic care? *Diab Med* 5, 177-199.

Williams CD, Harvey FE and Carey S, Morrish N, MacAughtry HW et al (c.1989) A technical and operational evaluation of a rule-based co-operative system for decision making in diabetes care. Department of Medicine, St Thomas' Hospital, London.

Williams DRR (1982) Planning Diabetic Services in the Cambridge Health District. MFCM dissertation.

Williams DRR (1985) Hospital admissions of diabetic patients: information from hospital activity analysis. *Diab Med* 2, 27-32.

Williams DRR, Munroe C, Hospedales CJ and Greenwood RH (1988) Do mini-clinics improve diabetic care? three year evaluation of Norwich community care scheme. Abstr. *Diab Med* 5, A27.

Williams DRR, Munroe C, Hospedales CJ and Greenwood RH (1990) A three year evaluation of the quality of diabetes care in the Norwich community care scheme. *Diab Med* 7, 74-9.

Williams DRR and Tallis D (1990) Epidemiologically Based Needs Assessments: Diabetes Mellitus. NHS Management Executive, London.

Wilson C, Brown V, Morley V, Browne L and Evans T (1991) Camberwell Diabetes Shared Care Scheme. King's College School of Medicine, London.

Wood J (1990) A review of diabetes care initiatives in primary care settings. *Health Trends* 22, 39-43.

Wojciechowski MT (1982) Systematic care of diabetic patients in a general practice. *J R Coll Gen Pract* 32, 531-3.

Wrench J G (1978) Integration of diabetic care - a diabetic clinic in general practice. *Health Bulletin* 36, 300-305.

Yudkin JS, Boucher BJ, Schopflin KE, Harris BT, Clagg HR et al. (1980) The quality of diabetic care in a London health district. *J Epidem Com Health* 34, 277-280.

Yudkin JS and Kinmonth AL (1987) Diabetic care - a quiet revolution. *Practitioner* 231, 1435-38.

Zander LI, Watson M, Taylor RW, and Morrell DC (1978) Integration of general practitioner and specialist antenatal care. *J R Coll Gen Pract* 28, 455-58.

PERSONAL DIABETIC RECORD CARD

NAME DoB M/F

ADDRESS

TEL No

GP & ADDRESS CONSULTANT & HOSPITAL

TEL No TEL No

ACTIVE MEDICAL PROBLEMS	DATE ENTERED	DATE INACTIVE

ISLINGTON SHARED CARE SCHEME

If found please return to:
Diabetic Unit, Whittington Hospital, London N19

DIABETIC HISTORY

DATE OF DIAGNOSIS: DATE ENTERED SCHEME:

DIAGNOSTIC RESULTS:

RBS ..... mmol/L (≥11 plasma glucose)
+/or
FBS ..... mmol/L (≥8 plasma glucose)
+/or
75G OGTT 2HR glucose ..... mmol/L (≥11)

Creat or Urea at Diagnosis ..... (≤120 µmol/L **or** ≤5.5 mmol/L)

SYMPTOMS AT ONSET:

CURRENT DRUG THERAPY:

FH

SOCIAL HISTORY

SMOKING ALCOHOL

FIRST EXAMINATION

BLOOD SUGAR

WEIGHT HEIGHT IDEAL BODY WEIGHT

URINE GLUCOSE KETONES

PROTEIN BLOOD

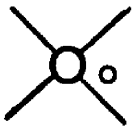
BP LYING STANDING

PULSE CVS

RS AS

INITIAL EXAMINATION (cont'd)

EYES

	R	L
ACUITY		
CORRECTED ACUITY GLASSES/PIN HOLE		
FUNDI		
PUPILS DILATED	YES/NO	YES/NO

CONDITION OF FEET:

PULSES	R	L	REFLEXES	R	L	SENS$^{N.}$	R	L
P.TIB			KNEE			PIN PRICK		
D.PED			ANKLE			VIB$^{N.}$		

INITIAL MANAGEMENT PLAN

DIET

INSULIN

NEXT APPOINTMENT

DATE	WT	URINE GLU	URINE KET	URINE ALB	Blood Glucose	Time After Last Meal	BM Stix Meter	PATIENT TEST URINE/BLOOD	BP	FEET R	FEET L	VISUAL ACUITY R	VISUAL ACUITY L	GP INITIALS H=HOSPITAL	% Hb_{A1} $N \leqslant 8.5$

DATE	WT	OTHER ACTIVE CONDITION(S)	TREATMENT PLAN	COMMENTS	% Hb_{A1} N ⩽ 8.5

ANNUAL REVIEW 1

DATE

C/O

HYPOs

ANGINA/CLAUDICATION

AUTONOMIC/IMP./GUT

SMOKING

ALCOHOL

DIET

	EYES R	EYES L			R	L
ACUITY			PULSES	P.TIB		
				D.PED		
FUNDI			REFLEXES	KNEE		
				ANKLE		
			SENS$^{N.}$	PP		
DILATED	YES/NO	YES/NO		VIB$^{N.}$		

ANNUAL REVIEW 2

DATE

C/O

HYPOs

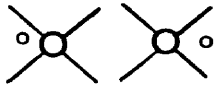
ANGINA/CLAUDICATION

AUTONOMIC/IMP./GUT

SMOKING

ALCOHOL

DIET

	EYES R	EYES L			R	L
ACUITY			PULSES	P.TIB		
				D.PED		
FUNDI			REFLEXES	KNEE		
				ANKLE		
			SENS$^{N.}$	PP		
DILATED	YES/NO	YES/NO		VIB$^{N.}$		

ANNUAL REVIEW 3

DATE

C/O

HYPOs

ANGINA/CLAUDICATION

AUTONOMIC/IMP./GUT

SMOKING

ALCOHOL

DIET

	EYES R	EYES L			R	L
ACUITY			PULSES	P.TIB		
				D.PED		
FUNDI			REFLEXES	KNEE		
				ANKLE		
			SENS$^{N.}$	PP		
DILATED	YES/NO	YES/NO		VIB$^{N.}$		

ANNUAL REVIEW 4

DATE

C/O

HYPOs

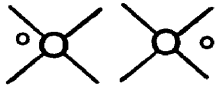
ANGINA/CLAUDICATION

AUTONOMIC/IMP./GUT

SMOKING

ALCOHOL

DIET

	EYES R	EYES L			R	L
ACUITY			PULSES	P.TIB		
				D.PED		
FUNDI			REFLEXES	KNEE		
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			SENS$^{N.}$	PP		
DILATED	YES/NO	YES/NO		VIB$^{N.}$		

ANNUAL REVIEW 5

DATE

C/O

HYPOs

ANGINA/CLAUDICATION

AUTONOMIC/IMP./GUT

SMOKING

ALCOHOL

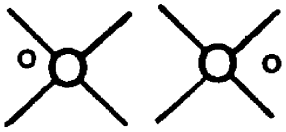
DIET

EYES

R L

ACUITY

FUNDI



DILATED YES/NO YES/NO

		R	L
PULSES	P.TIB		
	D.PED		
REFLEXES	KNEE		
	ANKLE		
SENS$^{N.}$	PP		
	VIB$^{N.}$		

ANNUAL REVIEW 6

DATE

C/O

HYPOs

ANGINA/CLAUDICATION

AUTONOMIC/IMP./GUT

SMOKING

ALCOHOL

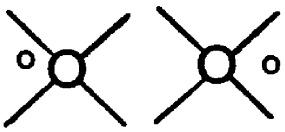
DIET

EYES

R L

ACUITY

FUNDI



DILATED YES/NO YES/NO

		R	L
PULSES	P.TIB		
	D.PED		
REFLEXES	KNEE		
	ANKLE		
SENS$^{N.}$	PP		
	VIB$^{N.}$		

ANNUAL REVIEW 7

DATE

C/O

HYPOs

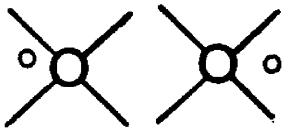
ANGINA/CLAUDICATION

AUTONOMIC/IMP./GUT

SMOKING

ALCOHOL

DIET

	EYES R	EYES L			R	L
ACUITY			PULSES	P.TIB		
				D.PED		
FUNDI			REFLEXES	KNEE		
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			SENS$^{N.}$	PP		
				VIB$^{N.}$		
DILATED	YES/NO	YES/NO				

ANNUAL REVIEW 8

DATE

C/O

HYPOs

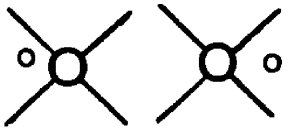
ANGINA/CLAUDICATION

AUTONOMIC/IMP./GUT

SMOKING

ALCOHOL

DIET

	EYES R	EYES L			R	L
ACUITY			PULSES	P.TIB		
				D.PED		
FUNDI			REFLEXES	KNEE		
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			SENS$^{N.}$	PP		
				VIB$^{N.}$		
DILATED	YES/NO	YES/NO				

ANNUAL REVIEW 9

DATE

C/O

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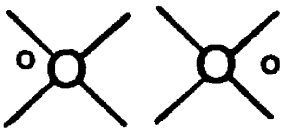
ANGINA/CLAUDICATION

AUTONOMIC/IMP./GUT

SMOKING

ALCOHOL

DIET

	EYES R	EYES L			R	L
ACUITY			PULSES	P.TIB		
				D.PED		
FUNDI			REFLEXES	KNEE		
				ANKLE		
			SENS$^{N.}$	PP		
				VIB$^{N.}$		
DILATED	YES/NO	YES/NO				

ANNUAL REVIEW 10

DATE

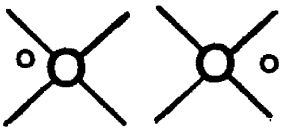
C/O

ANGINA/CLAUDICATION

AUTONOMIC/IMP./GUT

SMOKING

ALC(

	EYES R	EYES L
ACUITY		
FUNDI		
DILATED	YES/NO	YES/NO