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An evaluation of the impact of the Glasgow Diabetes Project on healthcare of people with type 2 diabetes

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PROJECT SUMMARY

Title of research project: An evaluation of the impact of the Glasgow Diabetes Project on healthcare for people with type 2 diabetes.

Research question: In what way does the introduction of a new model of care for people with type 2 diabetes improve care management, patient's health status, healthcare working practices, and patients' satisfaction?

Objectives:

Primary objectives -

- 1 To assess the extent to which the population of diabetic patients within an LHCC are identified and appropriately managed in terms of regular review
- 2 To assess changes in clinical indices of diabetic care (retinal screening, foot care, glucose, HbA1c, CHD risk factors, CHD events, other co-morbidity)
- 3 To evaluate accessibility and uptake of the service at the defined points of contact

Secondary objectives-

- 1 To assess general health status, health beliefs and health related behaviours across different diabetic client groups
- 2 To examine patients perceptions of their care and their motivation to participate in their care
- 3 Comparison with the ideal service and traditional care setting
- 4 To enumerate contacts with health care professionals and other health-related activities such as exercise referral schemes
- 5 To assess patients' awareness of the impact of organisational change

Design: Quasi-experimental, using a range of quantitative and qualitative tools at baseline and at 12-18 months following implementation of the new service.

Setting: Greater Shawlands LHCC

Subjects: At the time of the study the population of people with diabetes in Greater Shawlands LHCC was approximately 1450 people. Recruitment to the study of a representative sample was achieved by inviting every third person on each GP practice type 2 diabetes register to participate in the main study. Recruitment for a focus group sub study was performed through purposeful sampling.

Methods: Patient questionnaires were used to evaluate subjective accounts of general health status and individuals' attitudes to their diabetes management before and after implementation of the new service (Appendix A). SPSS software was used for statistical analysis of responses.

Clinical indicators of diabetes management were collected before and after by using the diabetes clinical information system, SCI-DC e.g. HbA1c, RBG, BP, HDL, total cholesterol, retinal screening, feet screening, smoking and exercise. While the diabetes

clinical information system identified all electronically recorded information, this still necessitated a manual trawl of patients' notes to collect incomplete data.

Patients' perceptions of the change in service delivery were explored through 8 focus group interviews; 5 at baseline, and 3 at 18 months thereafter.

Primary healthcare professionals' perceptions of diabetes care were measured after the new service was established through a specially designed and validated questionnaire (Appendix B).

Results: Patient questionnaires showed some worsening in general health (due mainly to conditions other than diabetes, especially musculoskeletal conditions), and stasis in attitudes of individuals coping with diabetes over the time period.

Clinical data showed statistically significant improvements in numerous indices of diabetes management including smoking, exercise, blood pressure and cholesterol levels.

Analysis of qualitative data of patients' perceptions showed appreciation of the new service for its convenience and user friendliness. Patients highlighted areas of service provision that are valued such as readiness of information and expertise and time to talk in depth with health care professionals.

Professionals' perceptions questionnaire showed a high level of satisfaction with the new service.

Conclusions: The new model of care is as good as the old model in terms of clinical outcomes. It has had a positive impact upon patients' health status. Furthermore it has been well received by patients and professionals and the study has also captured patients' interests and suggestions regarding service improvement which have been fed back to service providers for the enhancement of future service development. It is acknowledged that the service was still in a transition phase and that there was some overlap of service provision during this time.

PROJECT

Introduction

The organisation and management of diabetes care is a priority issue. In Scotland about 1:40 people have diabetes and this is expected to rise to 1:25 by 2010. Nine percent of annual NHS expenditure is on diabetes, of which 4.7% is on Type 2 diabetes. Guidelines for the development of diabetes services have directed recent innovations, most notably the NHS Health Services Guidelines' Key Features of a Good Diabetes Service, and the Scottish Diabetes Framework which lays out developmental stages for the coordination of all agencies involved in providing care for this client group. The Glasgow Diabetes Project was designed to meet the requirements of these documents and provide a service that is more accessible and which will reduce morbidity and mortality associated with diabetes.

The purpose of this research project has been to assess the extent to which the population of diabetic patients within an LHCC are identified and appropriately managed in terms of guidelines for best practice. An assessment was undertaken across the Type 2 diabetic client group of general health status, clinical markers of diabetic care management, and patients' health beliefs and health related behaviours before and after implementation of the new model of diabetes care. An outline of the key aspects of the patient journey including location of care; accessibility; uptake and systems for ongoing management was drawn. This included patients' perceptions of their care and their participation in self care. Healthcare professionals' perceptions of diabetes care were also measured across different professional groups using a specifically designed questionnaire.

Methodology

Research Governance

Ethical approval for the study was granted by the Greater Glasgow Primary Care NHS Trust Research Ethics Committee (Community and Mental Health) at the end of June 2003. The same Trust also granted Research and Development Management Approval for the study at this time.

Study Design

The study is based on a quasi-experimental design using a range of quantitative and qualitative tools at baseline and 12-18 months following implementation of the new diabetes service. The study comprised three distinct aspects to address the research question and objectives. Patients were invited to complete questionnaires as well as agreeing to the collection of various clinical parameters. A subgroup was invited to take part in a Focus Group Study. Thirdly, professionals involved in the care of diabetes were invited to complete a questionnaire to elicit their views and perceptions of diabetes care.

Participants

Participants comprised adults, elderly and people from ethnic minorities with diabetes mellitus within Greater Shawlands LHCC. At commencement of study 63028 patients were registered with practices within this LHCC, of which 1402 had type 2 diabetes. Healthcare professional participants were Practice Managers, Practice Nurses, District Nurses, Podiatrists, Dietitians and GP's within Greater Shawlands LHCC.

Data Collection

To allow evaluation of the new diabetes model of care, data was collected using a range of quantitative and qualitative tools at baseline and at 12-18 months after implementation of the new service.

Patients' clinical data was obtained through liaison with staff at the Primary Care Trust Headquarters and following discussion with their Data Protection Officer. Data which is centrally located in the new clinical information system was downloaded using patients' CHI numbers for confidentiality. This process proved both useful and also very time consuming - it provided access to data in line with data protection requirements but also delivered many repetitious and incomplete entries, requiring sifting, and identification of 'missing data'. Missing data was obtained as far as possible through liaison with practice staff that have access to patients' clinical records.

Liaison with Practice Managers and staff at the Trust HQ information was obtained on practice sizes, numbers of patients with type 2 diabetes, and healthcare systems in place for diabetes management. Through liaison with Practice Managers, Practice Nurses and reception staff demographic information was obtained for all patients on practices' type 2 diabetes registers. (For details of sampling strategy see below).

Patient questionnaires were used to measure general health and well being (SF-36), subjective accounts of living with diabetes (PAID questionnaire) and social support networks (RAND Social Activities Questionnaire). The SF-36 and PAID questionnaires were used at baseline and 12 months, but the Social Activities questionnaire was only used at baseline in response to patients comments regarding the usefulness and relevance of this questionnaire.

Healthcare professionals' perceptions of diabetes care were measured using the Perceptions Of Diabetes Questionnaire at one time point in July 2004. The questionnaire was sent to all GP's, Practice Nurses, District Nurses, Podiatrists, Dietitians and Practice Managers within Greater Shawlands LHCC – 112 people.

Qualitative data was collected to explore patients' perspectives of living with diabetes, their needs, and of healthcare provision, through use of focus group interviews (See Focus Group section of report for full details).

Sampling

In order to recruit patients to the study every third patient on each practices Type 2 diabetes register was selected. Some stratified sampling was also undertaken in order to ensure representation of ethnic minority groups. Five hundred and seventy six individuals were thus sent a letter with information about the study which also included a consent form for patients to sign and return if they were willing to participate i.e. to completing questionnaires and permit access to clinical records pertaining to their diabetes care. Following a reminder letter to all individuals who had not responded within 4 weeks the number of patients who consented to participate was 140. Of these a small number passed away within the first few months of the study, leaving a sample group of 136 individuals for this section of the study. (For information regarding sampling for the focus group study see the Focus Group section of the report).

Results of Clinical data

The results are presented in three stages. Firstly patients' clinical data is presented. Secondly professionals' views of diabetes care are described. Thereafter, the findings of the Focus Group study are presented.

The clinical data was analysed between before and after, time frames for comparison. They were further analysed by gender, age group and deprivation category. Power calculations have been utilized where appropriate.

Healthcare systems and processes of care

Numbers of patients and prevalence of diabetes within Greater Shawlands LHCC can be seen at Table 1.1.

Table 1.1: Greater Shawlands LHCC - summary figures

	Registered patients	Registered patients with type 2 diabetes	Prevalence of type 2 diabetes
Baseline*	63028	1402	2.2%
Follow up**	62635	1522	2.4%

*As in summer 2003

** As in autumn 2004

The majority of practices were providing level 3 care before the end of 2002, with one pilot practice providing this service from 2001. At the time of commencing this study one practice was not providing level 3 care. Level 3 care is where the General Practitioner has a register of diabetic patients and offers care in line with agreed local

treatment guidelines. This includes regular call and review and action to improve control of diabetes. In addition to regular monitoring and treatment of diabetes, the practice will undertake risk factor management as necessary. The General Practice also provide an annual report (based on SIGN dataset) for each diabetic patient in their care. Information from the practice is fed into the shared diabetes Clinical Information System.

By the end of the study period all practices within this LHCC were providing level 3 care for patients. Each practice has a named lead GP for diabetes care, who along with a Practice Nurse from each practice had undertaken the necessary accredited diabetic training course. All community Dietitians and Podiatrists linked to the Diabetes project were also required to complete a credited diabetes course.

All practices maintain a computerised register of diabetic patients, eighty five percent of which (n=12) are on the GPASS system and 15% of which (n=2) are not. Similarly, annual recall for review of diabetic patients is implemented by all practices, the majority through the GPASS system, the remainder through other methods including box file and reference to previous clinic sheets.

Patient demographics

Patient demographics for the population, sample and LHCC are shown in Table 2.1.

Table 2.1: Patient demographic details

	Population	Sample	[LHCC exc sample]	p-value
Total Number	1402	136	1266	---
Gender				0.10
Female	662 (47%)	55 (40%)	607 (48%)	
Male	740 (53%)	81 (60%)	659 (52%)	
Mean Age (st dev) in years	63.76 (13.59)	65.38 (11.96)	63.57 (13.75)	0.08
Age Category				0.003
<55 yrs	346 (25%)	28 (21%)	318 (25%)	
55-64 yrs	324 (23%)	23 (17%)	303 (24%)	
65-74 yrs	415 (30%)	56 (41%)	357 (28%)	
>74 yrs	317 (23%)	29 (21%)	288 (23%)	
Deprivation Category				0.007
1	38 (3%)	3 (2%)	35 (3%)	
2	260 (19%)	27 (20%)	233 (18%)	
3	160 (11%)	26 (19%)	134 (11%)	
4	252 (18%)	32 (24%)	220 (17%)	
5	85 (6%)	8 (6%)	77 (6%)	
6	187 (13%)	11 (8%)	176 (14%)	
7	420 (30%)	29 (21%)	391 (31%)	
Grouped Dep Cat				0.001
1 & 2	268 (21%)	30 (22%)	268 (21%)	
3, 4 & 5	431 (34%)	66 (49%)	431 (34%)	
6 & 7	567 (45%)	40 (29%)	567 (45%)	
Ethnic Origin				<0.001
Asian	254 (18%)	8 (6%)	246 (19%)	
Other	1148 (82%)	128 (94%)	1020 (81%)	
Mean RAND score (st dev)	---	28.43 (7.28)	---	---
Missing N		11		

Proportions (and mean/standard deviation for age) given for LHCC type 2 Diabetic population and for Sample of 136. P-value is for chi-squared test of equal proportions comparing our sample against the remaining LHCC patients (as if we compared the full LHCC, the groups would not be independent). Significant differences shown in bold. There is evidence of a difference in the distributions of age category, deprivation category and ethnic origin between our sample and the rest of the LHCC. Unfortunately this means we cannot say our sample is representative of the full LHCC patient group at the time.

Patient Questionnaires - General Health and Wellbeing (SF36) and Diabetes-specific (PAID)

The SF-36 questionnaire is a widely used and well known tool which has been found to be reliable and valid in the measurement of general health and well being. It consists of 36 items and generates scores for eight domains of health: General Health, Physical Function, Social Function, Mental Health, Bodily Pain, Role Limitation – Physical, Role Limitation – Mental, and Energy / Vitality. The scores range from 0-100, with 0 indicative of poor health and well being and 100 indicative of excellent health and well being (Table 3.1).

The PAID (problem areas in diabetes questionnaire) is a reliable and valid tool used to measure diabetes-specific emotional distress. It was developed by the Joslin Diabetes Centre, Boston. The PAID total score ranges from 0-100, with 0 being indicative of the least emotion distress relating to diabetes and 100 being indicative of the greatest emotion distress relating to diabetes (Table 3.1).

Table 3.1: Overall patient questionnaire paired results

	No Pairs	Baseline†	1 yr follow up†	Mean difference‡	p-value	95% CI for diff
Physical Function	88	75 (50 - 89)	70 (33 - 85)	-3.69	0.10	-8.05 to 0.67
Role Limitation Physical	88	75 (0 - 100)	50 (0 - 100)	-7.95	0.08	-16.88 to 0.97
Role Limitation Mental	88	88 (33 - 100)	100 (0 - 100)	-0.76	0.86	-9.37 to 7.85
Social Function	88	89 (56 - 100)	78 (47 - 100)	-4.68	0.07	-9.82 to 0.46
Mental Health	88	71.59 (21.50)	69.73 (21.17)	-1.86	0.18	-4.57 to 0.85
Energy / Vitality	88	51.42 (24.27)	48.86 (22.82)	-2.56	0.21	-6.55 to 1.43
Bodily Pain	88	70.39 (27.27)	63.94 (29.39)	-6.44	0.02	-11.71 to -1.18
General Health	88	54.80 (24.17)	51.70 (23.00)	-3.09	0.13	-7.15 to 0.96
PAID	94	13 (5 - 25)	13 (6 - 27)	1.64	0.14	-0.57 to 3.84

† Figures are mean (st dev) for mental health to general health and median (interquartile range) for physical function to social function and PAID [due to skewed distributions].

‡ Figures are mean for all [as distributions of differences are not skewed].

These results were further analysed to demonstrate changes in the different parameters and these are presented in Table 3.2.

Table 3.2: Overall questionnaire results that have increased, decreased or stayed the same

	No Pairs	Decreased		Same	Increased	
		N (%)	Mean Diff		N (%)	Mean Diff
Physical Function	88	43 (49%)	-17.09	18 (21%)	27 (31%)	15.19
Role Limitation Physical	88	29 (33%)	-53.45	44 (50%)	15 (17%)	56.67
Role Limitation Mental	88	21 (24%)	-53.95	47 (53%)	20 (23%)	53.30
Social Function	88	34 (39%)	-27.44	33 (38%)	21 (24%)	24.81
Mental Health	88	41 (47%)	-11.61	22 (25%)	25 (28%)	12.48
Energy / Vitality	88	46 (52%)	-14.57	12 (14%)	30 (34%)	14.83
Bodily Pain	88	37 (42%)	-28.24	28 (32%)	23 (26%)	20.78
General Health	88	51 (58%)	-14.88	9 (10%)	28 (32%)	17.39
PAID	94	36 (38%)	-7.04	8 (9%)	50 (53%)	8.15

Test used is students paired sample t-test. Taking the example of bodily pain (the only significant change here) we can say that there is evidence that the score decreased on average during the 1 year follow up period. It is highly likely that this change is between -11.71 and -1.18, with a best estimate of -6.44. There is no evidence of any of the other domains changing, on average, over the period, however for the sample each one decreased with all the mean differences negative.

These terms apply to all tests of this sort for patient questionnaire data and clinical data. For the full data set above results have also been broken down into the numbers that decreased, increased and stayed the same over the period although no frequency measures have been conducted.

Following this the data set has been broken down into groups and this analysis repeated in order to find any changes within the different groups (Appendices 1; 2; 3; 4;5; 6; 7;8; 9). Analyses was conducted by gender, by age group and by deprivation category.

From these, it can be seen that there were statistically significant deterioration in the mental health function for men but not for women (Appendix 1 and 2). Those aged under 55 years of age showed a significant deterioration in role limitation regarding physical, mental and general health aspects (Appendix 3). This was not replicated across the other age bands of between 55 and 74 years. The over 74 year old age group described a significant reduction in physical function and role, energy and bodily pain (Appendix 4, 5, 6). The 65 -74 year age group and 74 plus age group experienced deterioration in their PAID score (Appendices 5, 6).

Only dep cats 1 and 2 showed a significant reduction in physical function and role and general bodily pain (appendix 7).

Patient Clinical Data

The clinical data in relation to the patients' main diabetes and cardiac parameters are presented in Tables 4.1 and 4.2.

Table 4.1: Overall clinical paired results

	No Pairs	Baseline†	1 yr follow up†	Mean difference	p-value	95% CI for diff
HbA1c	113	8.06 (1.92)	7.81 (1.51)	-0.25	0.18	-0.62 to 0.12
RBG	56	11.62 (3.93)	8.91 (3.11)	-2.71	<0.001	-3.80 to -1.61
Creatinine	109	94.15 (42.02)	97.25 (71.34)	3.10	0.43	-4.60 to 10.80
Cholesterol	102	5.13 (1.07)	4.50 (0.93)	-0.64	<0.001	-0.87 to -0.41
HDL	71	1.20 (0.34)	1.43 (0.66)	0.22	0.001	0.09 to 0.36
Systolic BP	130	145.22 (17.49)	140.15 (18.35)	-5.08	0.01	-9.00 to -1.15
Diastolic BP	130	79.96 (10.50)	75.13 (10.99)	-4.83	<0.001	-6.88 to -2.78
Weight	121	84.87 (17.06)	84.39 (17.01)	-0.48	0.31	-1.43 to 0.46
BMI	120	30.05 (5.49)	30.10 (5.37)	0.05	0.80	-0.35 to 0.45

† Figures are mean (st dev).

There was a significant improvement in random blood glucose, cholesterol levels, HDL and both systolic and diastolic blood pressures. These were further analysed to compare increase, decrease or no change in result and are presented in Appendix 10.

Table 4.2: Clinical results continued

	Baseline	1 yr follow up	p-value †
Smoking Status			0.007
Current smoker	21 (18%)	12 (10%)	
Ex smoker	37 (32%)	46 (40%)	
Non smoker	58 (50%)	58 (50%)	
Physical Activity			0.002
Physically impossible	2 (4%)	3 (6%)	
Avoids even trivial	12 (25%)	7 (15%)	
Light	25 (52%)	19 (40%)	
Moderate	9 (19%)	18 (38%)	
Heavy	0 (0%)	1 (2%)	
Pulse Left			0.25
Present	90 (99%)	87 (96%)	
Absent	1 (1%)	4 (4%)	
Pulse Right			0.03
Present	86 (99%)	80 (92%)	
Absent	1 (1%)	7 (8%)	
Sense Left			0.73
Normal	78 (90%)	80 (92%)	
Impaired	9 (10%)	7 (8%)	
Sense Right			0.45
Normal	72 (89%)	75 (93%)	
Impaired	9 (11%)	6 (7%)	
Retina Left			0.68
Normal	50 (98%)	49 (96%)	
Mild Background	0 (0%)	1 (2%)	
Established	1 (2%)	1 (2%)	
Retina Right			0.68
Normal	48 (98%)	47 (96%)	
Mild Background	0 (0%)	1 (2%)	
Established	1 (2%)	1 (2%)	

† McNemars test used so only paired data is analysed.

Taking Smoking status as an example, we can say that there is evidence that the distributions of proportions changed significantly over the 1 year follow up period. Here

the percentage of ex smokers increased significantly. Alternatively, there is no evidence of a change in the distribution of proportions of patients with their left pulse present, for example. These terms can be applied to all tests of this sort in the clinical data section.

Following this the data set has been broken down into groups and analysis repeated in order to find any changes within the different groups according to gender, age and deprivation category (Appendices 11, 12, 13, 14, 15, 16, 17, 18, 19). This further analysis presented a similar trend to the overall database.

Where there are national standards set for clinical parameters, results were compared to these. There was significant improvement in hyperlipidaemia and hypertension (Table 4.3).

Table 4.3: Clinical guidelines paired results

	No pairs	Baseline	1yr follow up	p-value
HbA1c	113			0.83
Poor control		41 (36%)	39 (35%)	
Borderline Control		42 (37%)	39 (35%)	
Good Control		30 (27%)	35 (31%)	
Creatinine	109			0.06
Normal		102 (94%)	97 (89%)	
Elevated		7 (6%)	12 (11%)	
Hyperlipidaemia	102			<0.001
Normal		50 (49%)	77 (76%)	
Elevated		52 (51%)	26 (25%)	
HDL	71			0.29
Normal		58 (82%)	62 (87%)	
Low		13 (18%)	9 (13%)	
Hypertension	130			0.001
Normal		45 (35%)	71 (55%)	
Elevated		85 (65%)	59 (45%)	
BMI	120			0.77
Normal		19 (16%)	21 (18%)	
Overweight		101 (84%)	99 (82%)	

McNemars test used so only paired data analysed.

Results were compared between the clinical parameters measured and patients' self reporting of areas from the SF36, the RAND and the PAID questionnaires. These are presented in Table 4.4 and 4.5.

Table 4.4: Patient questionnaire / Clinical data relationships

1 yr follow up	HbA1c	RBG	Creatinine	Chol.	HDL	Systolic	Diastolic	Weight	BMI	RAND
Physical Function‡	0.018	-0.097	0.152	0.080	-0.016	-0.078	0.049	-0.111	-0.252	0.120
p-value	0.82	0.35	0.07	0.33	0.87	0.303	0.52	0.15	0.001	0.115
Role Limitation Physical‡	0.067	0.042	0.214	0.024	-0.137	-0.033	0.105	0.012	-0.127	0.034
p-value	0.45	0.72	0.02	0.79	0.20	0.69	0.21	0.89	0.14	0.68
Role Limitation Mental‡	0.005	-0.102	0.309	0.010	-0.102	0.072	0.038	0.034	-0.114	0.078
p-value	0.96	0.38	0.001	0.91	0.36	0.40	0.66	0.70	0.20	0.37
Social Function‡	0.097	-0.028	0.130	-0.019	-0.054	0.008	-0.012	-0.136	-0.237	0.189
p-value	0.24	0.79	0.13	0.82	0.60	0.92	0.88	0.09	0.004	0.02
Mental Health†	0.007	-0.222	0.284	-0.020	-0.031	0.063	0.021	-0.105	-0.274	0.303
p-value	0.95	0.13	0.015	0.87	0.82	0.44	0.84	0.35	0.01	0.004
Energy/ Vitality†	0.006	-0.175	0.175	0.014	-0.036	0.058	0.057	-0.187	-0.290	0.215
p-value	0.96	0.24	0.14	0.91	0.79	0.59	0.60	0.09	0.006	0.046
Bodily Pain†	-0.023	-0.152	0.101	0.093	-0.079	0.007	0.009	-0.186	-0.344	0.100
p-value	0.84	0.31	0.40	0.43	0.56	0.95	0.93	0.092	0.001	0.36
General Health†	-0.86	-0.294	0.177	-0.041	0.136	-0.019	-0.100	-0.190	-0.237	0.213
p-value	0.46	0.045	0.14	0.73	0.32	0.86	0.35	0.09	0.03	0.048
PAID‡	0.080	0.174	-0.276	0.068	0.007	-0.069	-0.053	0.151	0.178	-0.136
p-value	0.30	0.08	<0.001	0.39	0.94	0.34	0.47	0.04	0.019	0.06

† Figures are r values (Pearson).

‡ Figures are z values (Kendall).

Table 4.5: Patient questionnaire / Clinical data relationships cont.

1 yr follow up	Current Smoker	Ex Smoker	Non Smoker	p-value
Physical Function‡	70 (65 – 85)	60 (45 – 85)	75 (30 – 90)	0.76
Role Limitation Physical‡	75 (25 – 100)	75 (0 – 100)	25 (0 – 100)	0.35
Role Limitation Mental‡	33 (0 – 100)	100 (33 – 100)	100 (0 – 100)	0.27
Social Function‡	100 (22 – 100)	78 (33 – 100)	78 (56 – 100)	0.98
Mental Health†	69.00 (21.31)	70.29 (20.75)	68.57 (23.13)	0.95
Energy/ Vitality†	50.42 (29.73)	46.25 (20.35)	50.48 (23.24)	0.74
Bodily Pain†	74.17 (27.82)	62.75 (26.18)	60.62 (30.77)	0.36
General Health†	49.92 (26.03)	55.36 (23.35)	51.98 (22.27)	0.75
PAID‡	13 (6 – 51)	10 (8 – 20)	16 (5 – 28)	0.87

† Figures are mean (st dev), test is students' two independent samples t-test.

‡ Figures are median (interquartile range), test is kruskal wallis test.

Table 4.6: Patient questionnaire / Clinical predictors

Outcome (at follow up)	Adjusted R ²	Sample size	Predictors (at baseline)	P-value	Coefficient estimate & 95% CI
Mental Health	67%	88	SF36 Mental Health	<0.001	0.81 (0.69 to 0.93)
Energy/ Vitality	46%	88	SF36 Energy/ Vitality	<0.001	0.64 (0.49 to 0.79)
Bodily Pain	38%	88	SF36 Bodily Pain	<0.001	0.67 (0.48 to 0.85)
General Health	45%	88	SF36 General Health	<0.001	0.64 (0.49 to 0.79)
HbA1c	11%	113	HbA1c	<0.001	0.27 (0.13 to 0.41)
Systolic BP	34%	130	Systolic BP	0.02	0.22 (0.04 to 0.40)
Diastolic	15%	130	Diastolic BP	<0.001	0.41 (0.25 to 0.58)
BMI	84%	120	BMI	<0.001	0.89 (0.83 to 0.97)

Backward stepwise selection (involving first order terms for baseline value of response variable and baseline values for HbA1c, BP's, BMI, age, sex, dep cat, RAND, ethnic Lindsay G, McDowell J, McPhail K (2006) An evaluation of the impact of the Glasgow Diabetes project for healthcare for patients with type 2 diabetes. Nursing & Health Care, University of Glasgow, Glasgow ISBN: 9780852618233

origin, practice and smoking status) was carried out to come up with the final models displayed in Tables 4.4; 4.5; 4.6. In all cases only the baseline value of the variable in question was found to be significant in contributing to follow up value. Therefore there is no evidence that the aforementioned variables (in the list in brackets) predict the outcome value in each case. This cannot be done for remaining SF36 scores and PAID as they are not distributed normally and so cannot be entered into a linear regression model.

The management of diabetes can be monitored through assessment of clinical measures of optimal care as outlined within the new GMS contract of 2003 (Investing in General Practice 2003 www.bma.org.uk). Key clinical indices for diabetes management were analysed for patients achieving or exceeding targets as can be seen from Table 4.7. Targets used were those defined in SIGN guidelines. There was an improvement in the majority of measures after the introduction of the new service.

Table 4.7: Key clinical variables baseline and one year following implementation of the new Community-based diabetic service

	Baseline % (n)	One year after introduction of new service % (n)	Change from baseline P-value <i>p</i>
Systolic BP <130mmHg	14.6% (n=130)	26.5% (n=136)	0.0362*
Diastolic BP <85mmHg	69.2% (n=130)	85.3% (n=136)	0.0020*
Total cholesterol < 5 mmol/L	47.1% (n=104))	68.5% (n=130)	0.0005*
BMI <25kg/m ²	11.3% (n=134)	9.2% (n=130)	0.3743
BMI <30kg/m ²	54.0% (n=134)	56.2% (n=130)	0.8203
HBA1c <7.5	45.7% (n=116)	49.2% (n=132)	0.4736
Random blood sugar <8	17.9% (n=67)	45.2% (n=73)	0.0043*

* Statistically significant at p< 0.05 level

Medication prescriptions

Data was captured on prescribing practices at two time points. The first was at the beginning of the service redesign and the second was at 2 years after initiation of the change in service. Data was collected on the 138 patients who had consented.

Table 5.1: Changes in prescription of sulphonylureas

Sulphonylureas		Follow up		
		Not on drug	On drug	Total
Baseline	Not on drug	72(56%)	18 (14%)	90
	On drug	9 (7%)	29(23%)	38 (30%)
	Total	81	47 (37%)	128

Missing N: 8 (6%); P value 0.12

The percentage of patients in the sample on a sulphonylurea increased from 30% to 37% at follow up. This was not found to be statistically significant (using a 0.05 significance level) so there is not enough evidence to say that this increase was not a random occurrence.

There were 26 patients on gliclazide at both time points. The median dose at baseline was 100mg and this was found to increase to 160mg at follow up. The Wilcoxon Signed rank test produced a p-value of 0.009. On average, there was a significant increase in the prescribing dose of Gliclazide to patients that were on the drug at both baseline and follow up.

There were insufficient numbers of patients on other sulphonylureas for statistical analysis. Categorical change in dose for all sulphonylurea drugs was undertaken. From this, 66% of patients remained on the same dose, 35% experienced an increase in dose and no-one had their dose decreased.

Table 5.2: Change in prescription of metformin

Metformin		Follow up		
		Not on drug	On drug	Total
Baseline	Not on drug	62(49%)	22(17)	84
	On drug	3 (2%)	40(32%)	43 (34%)
	Total	65	62 (49%)	127

Missing N: 9 (7%); P-value <0.001

There was a statistically significant increase in the prescribing of Metformin. This was true for the increase in dose and the frequency of prescription.

While there was an increase in the number of patients who required insulin from baseline to follow up, this was not statistically significant.

Table 5.3: Change in prescription of all diabetes medications

Sulphonylureas, Metformin, Insulin, Triglitzones		Follow up		
		Not on drug	On drug	Total
Baseline	Not on drug	34 (27%)	18 (14%)	52
	On drug	0 (0%)	76 (59%)	76 (59%)
	Total	34	94 (73%)	128

Missing N: 8 (6%); P-value<0.001

The percentage of patients on any diabetic drugs increased from 59% to 73% between baseline and follow up. This change occurred through 14% of patients commencing a drug during this period, while no-one who was on a drug at baseline was taken off it. There was a significant increase in the proportion of patients that were prescribed some form of diabetes medication and could suggest that this was due to improved management from the new service.

Table 5.4: Change in number of diabetes medications

No. pairs	Decreased No drugs	Same No. drugs	Increased No. drugs	P-value
126	5 (4%)	82(65%)	39 (31%)	0.001

There was a statistically significant difference between baseline and follow up that the number of diabetes drugs prescribed to patients increased (Table 5.4).

Table 5.5: Change in prescription of Ace Inhibitors

Ace Inhibitors		Follow up		
		Not on drug	On drug	Total
Baseline	Not on drug	69 (54%)	20 (16%)	89
	On drug	2 (2%)	37 (29%)	39 (31%)
	Total	71	57 (45%)	128

Missing N: 8 (6%); P-value<0.001

Table 5.6: Change in prescription of Angiotensin Receptor Antagonists (ARA)

ARA		Follow up		
		Not on drug	On drug	Total
Baseline	Not on drug	114 (90%)	6 (5%)	120
	On drug	0 (0%)	7 (6%)	7 (6%)
	Total	114 (90%)	13 (10%)	127

Missing N: 9 (7%); P-value<0.031

Table 5.7: Change in prescription of all hypertensive drugs

All hypertensive drugs		Follow up		
		Not on drug	On drug	Total
Baseline	Not on drug	34 (27%)	18 (14%)	52
	On drug	0 (0%)	76 (59%)	76 (59%)
	Total	34	94 (73%)	128

Missing N: 8 (6%); P-value<0.001

Table 5.8: Change over time in prescription of statins

All hypertensive drugs		Follow up		
		Not on drug	On drug	Total
Baseline	Not on drug	36 (28%)	32 (25%)	68
	On drug	1 (1%)	59 (46%)	60 (47%)
	Total	37	91 (71%)	128

Missing N: 8 (6%); P-value<0.001

Table 5.9: Change in prescription of aspirin

Aspirin		Follow up		
		Not on drug	On drug	Total
Baseline	Not on drug	60 (47%)	24 (19%)	84
	On drug	2 (2%)	41 (32%)	43 (34%)
	Total	62	65(51%)	127

Missing N: 8 (6%); P-value<0.001

There was statistical significance in the prescribing of all Ace inhibitors, ARAs, hypertensive drugs, statins and aspirin (Table 5.5; 5.6; 5.7; 5.8; 5.9)

There were no statistically significant results around the prescribing of the triglitazones; diuretics, beta blockers.

Data were analysed to determine if there was a link between the changes in diabetes drug usage to changes in diabetes clinical measurements. Those patients who had experienced an improvement in their HbA1c between baseline and follow up were examined for prescription aspects. There were 61 people in total. There was no significant difference in prescriptions of any drug in relation to improvement of diabetes clinical parameters. Those patients who showed an improvement in clinical measurements also had their dose increased on average and suggests that this led to the improvement.

Data were analysed to determine if there was a link between the changes in hypertension

Lindsay G, McDowell J, McPhail K (2006) An evaluation of the impact of the Glasgow Diabetes project for healthcare for patients with type 2 diabetes. Nursing & Health Care, University of Glasgow, Glasgow ISBN: 9780852618233

drug usage to changes in hypertension clinical measurements. Changes in prescription of all hypertensive drugs had a statistically significant result for both systolic and diastolic blood pressure.

Data were analysed to determine if there was a link between the changes in cholesterol drug use to changes in cholesterol clinical measurements. The change in prescription of statins was statistically significant ($p < 0.001$).

Of 127 patients records reviewed, only 5 were referred to an exercise programme as part of their diabetes management.

There was a median of 15.5 visits per patient for GP attendances for non diabetes reasons in the 2 year period (range 10-26.75); median 2 visits per patient for GP diabetes attendances; only one GP emergency diabetes attendance.

Data was collected to determine hospital admissions and clinic attendances (Table 5.10; 5.11). GP attendances were separated between routine GP care and attendances specifically for diabetes care. Hospital attendances were separated between clinic appointments for diabetes and for other clinical situations e.g. cancer.

Table 5.10: GP attendances

	Missing Data	Frequency of Zero	Median	IQ Range *
GP attendances	8 (6%)	0 (0%)	15.5	10-26.75
GP diabetes attendances	10 (7%)	9 (7%)	2	1-4
Emergency GP Diabetes	10 (7%)	122 (97%)	1	1-1
GP DNAs	9 (6%)	106 (84%)	1	1-1

* for patients with more than one attendance/DNA

Table 5.11: Hospital attendances

	Missing Data	Frequency of Zero	Median	IQ Range *
Hospital appointments	19 (14%)	82 (70%)	1	1-2
Hospital diabetes clinics	19 (14%)	20 (17%)	3	2-6
Hospital clinic DNAs	17 (13%)	33 (28%)	2	1-2

* for patients with more than one appointment/diabetes clinic DNA

During the data collecting period, there was one person who had a myocardial infarction; four who had an anginal attack and four who had a cerebrovascular accident.

Professionals' Perceptions of Diabetes

There were 112 numbers of professionals within the population. All were sent the PODQ and asked to complete and return it. The response rate was 34% (n=38) and their demographic details are below.

Gender: Males: 9 (24%)
Females: 29 (76%)

Qualification year: Before 1991: 28 (78%)
1991 – 1995: 4 (11%)
1996 – 2000: 4 (11%)
Unknown: 2

Profession: Practice Manager: 2 (5%) General Practitioner: 14 (37%)
Practice Nurse: 12 (32%) Podiatrist: 5 (13%)
Dietitian: 1 (3%) District Nurse: 4 (11%)

Diabetic Training: Bradford: 15 (39%), Warwick: 4 (11%), Other: 5 (13%)

Practice Organisation

When asked who runs the diabetic clinic in your practice the responses were:

GP only: 4 (11%);
PN only: 5 (13%)
GP and PN: 20 (53%)
GP, PN, Podiatrist and Dietitian: 8 (23%)

When asked how much time was spent with each client the responses were:

10 mins: 2 (6%)
15 mins: 1 (3%)
20 mins: 7 (21%)
30mins: 24 (71%)

All were asked about their satisfaction with care delivery, their workloads and how these were linked to resources (Tables 6.1 - 6.4).

Table 6.1: Satisfaction with the care delivery system.

1 (not at all satisfied)	2	3	4	5 (very satisfied)	p-value
0 (0%)	2 (5%)	3 (8%)	17 (45%)	16 (42%)	<0.001

Chi-squared test for equal proportions used. There is evidence that the proportions are not equal and it appears that in general HCP's are satisfied with the new system of care.

Table 6.2: Workload attributed to diabetic care.

1 (too much)	2	3	4	5 (not enough)	p-value
2 (5%)	12 (32%)	20 (54%)	2 (5%)	1 (3%)	<0.001

Chi-squared test for equal proportions used. There is evidence that the proportions are not equal and it appears that in general HCP's do not feel strongly towards either case.

Table 6.3: Workload attributed linked to adequate time and resources.

	1 (adequate)	2	3	4	5 (inadequate)
1 (too much)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (100%)
2	0 (0%)	4 (44%)	1 (11%)	3 (33%)	1 (11%)
3	5 (25%)	2 (10%)	5 (25%)	5 (25%)	3 (15%)
4	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
5 (not enough)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)

The horizontal access addresses time and resource issues. The vertical access addresses perceived workload issues. Chi-squared test for linear trend p-value = 0.04 so there is evidence of an association between the HCP's views on the workload attributed to diabetes care and the adequacy of time and resources to treat type 2 diabetes effectively. It appears that two HCP's think there is inadequate time and resources to effectively treat patients with type 2 diabetes who also think that too much workload is attributed to diabetes care. No-one indicated that they felt they had adequate time and resources and an adequate workload. The majority (44%) appeared to indicate sufficient time, resources and workload associated with the management of people with diabetes.

Table 6.4: Types of care provided by each practice.

	Practice										
	A	E	F	G	H	I	J	K	L	M	N
Child	S	S	N	S	S	S	S	S	N	N	S
Teen	S	S	N	S	S	S	S	S	N	S	S
Adult	S	S	N	S	S	S	S	S	S	S	S
Elderly	S	S	N	S	S	S	S	S	S	S	S
Child	S	S	U	S	S	U	S	U	S	N	U
Teen	S	S	U	S	S	S	S	U	S	S	U
Adult	A	S	A	S	A	A	A	S	A	A	A
Elderly	A	A	A	S	A	A	A	S	A	A	A

A = All care, N = No care, S = Shared care, U = Unknown

Clinical Issues

Professionals were asked several questions in relation to a variety of clinical issues. They were first asked to rate the importance of methods of screening for diabetes and results are shown in Table 7.1.

Table 7.1: Importance of methods of screening.

	Profession								p-value‡
	All	p-value†	PM's	GP's	PN's	Pod's	Dietn's	DN's	
Urine testing		0.54							0.34
1 (not important)	4 (11%)		0 (0%)	1 (7%)	3 (25%)	0 (0%)	0 (0%)	0 (0%)	
2	6 (16%)		0 (0%)	2 (14%)	3 (25%)	1 (20%)	0 (0%)	0 (0%)	
3	10 (27%)		0 (0%)	6 (43%)	1 (8%)	2 (40%)	1 (100%)	0 (0%)	
4	9 (24%)		0 (0%)	3 (21%)	3 (25%)	0 (0%)	0 (0%)	3 (75%)	
5 (very important)	8 (22%)		1 (100%)	2 (14%)	2 (17%)	2 (40%)	0 (0%)	1 (25%)	
Fasting Blood Glucose		<0.001							0.55
1 (not important)	2 (5%)		0 (0%)	1 (7%)	0 (0%)	0 (0%)	0 (0%)	1 (25%)	
2	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	1 (3%)		0 (0%)	1 (7%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
4	4 (11%)		1 (50%)	3 (21%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
5 (very important)	30 (81%)		1 (50%)	9 (64%)	12 (100%)	4 (100%)	1 (100%)	3 (75%)	
Random Blood Glucose		<0.001							0.65
1 (not important)	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	3 (8%)		0 (0%)	3 (21%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	5 (13%)		1 (50%)	2 (14%)	1 (8%)	1 (20%)	0 (0%)	0 (0%)	
4	20 (53%)		1 (50%)	7 (50%)	6 (50%)	3 (60%)	1 (100%)	2 (50%)	
5 (very important)	10 (26%)		0 (0%)	2 (14%)	5 (42%)	1 (20%)	0 (0%)	2 (50%)	
Oral Glucose Tolerance Tests		0.25							0.12
1 (not important)	8 (21%)		0 (0%)	5 (36%)	1 (8%)	0 (0%)	1 (100%)	1 (25%)	
2	3 (8%)		0 (0%)	1 (7%)	0 (0%)	1 (20%)	0 (0%)	1 (25%)	
3	12 (32%)		0 (0%)	6 (43%)	4 (33%)	1 (20%)	0 (0%)	1 (25%)	
4	7 (18%)		2 (100%)	0 (0%)	2 (17%)	2 (40%)	0 (0%)	1 (25%)	
5 (very important)	8 (21%)		0 (0%)	2 (14%)	5 (42%)	1 (20%)	0 (0%)	0 (0%)	
Glucose 2hrs after a Meal		0.01							0.60
1 (not important)	6 (17%)		0 (0%)	3 (21%)	2 (18%)	0 (0%)	1 (100%)	0 (0%)	
2	6 (17%)		0 (0%)	4 (29%)	0 (0%)	1 (20%)	0 (0%)	1 (25%)	
3	14 (39%)		0 (0%)	5 (36%)	5 (45%)	3 (60%)	0 (0%)	1 (25%)	
4	9 (25%)		1 (100%)	2 (14%)	3 (27%)	1 (20%)	0 (0%)	2 (50%)	
5 (very important)	1 (3%)		0 (0%)	0 (0%)	1 (9%)	0 (0%)	0 (0%)	0 (0%)	

† Chi-squared test for equal proportions used on proportions of each rating answer.

‡ Chi-squared test for equal proportions used on distributions of proportions for each profession.

There is evidence that the proportions are not equal regarding Fasting Blood Glucose and Random Blood Glucose and it appears that in general the HCP's think these 2 are important. There is also evidence of differences with Glucose 2hrs after a meal but in general the HCP's do not feel strongly either way. There is no evidence of any differences in the distributions of proportions between the profession groups.

When asked regarding the importance of ongoing education and advice, Chi-squared tests

for equal proportions show all distributions contain significant differences except for Urinary Glucose Monitoring (Appendix 20). It appears that the HCP's view the ongoing education and advice of all issues except this one as important.

Asked about how important they rate the annual undertaking of parameters produced similar results (Appendix 21). Chi-squared tests for equal proportions show all distributions contain significant differences except for Testing Urine for Glucose. It appears that the HCP's view the annual uptaking of all parameters except this and height as important. However, a significantly greater proportion views height as unimportant.

Similar to this, in general all HCPs viewed all management issues as important (Appendix 22). There is evidence that the distributions for each issue do not contain equal proportions. There is no evidence of any differences in the distributions of proportions between the profession groups.

In considering the importance of referrals to other HCPs, there is evidence that the distributions for each issue do not contain equal proportions and it appears that in general the HCP's view all as important. There is no evidence of any differences in the distributions of proportions between the profession groups (Appendices 23).

When considering the importance of recording findings and results, there is evidence that the distributions for each issue do not contain equal proportions and it appears that in general the HCP's view medical notes and practice diabetes register as important but generally do not hold strong views either way on patient held records. There is no evidence of any differences in the distributions of proportions between the profession groups.

Attitudes to diabetes

Professionals were asked about their attitudes to diabetes in relation to other chronic diseases, their own confidence and linked to training. The results are presented in Tables 8.1 – 8.11 inclusive.

Table 8.1: Treatment of type 2 diabetes compared to other chronic diseases.

	Profession							p-value‡	
	All	p-value†	PM's	GP's	PN's	Pod's	Dietn's		DN's
Hypertension		<0.001							0.95
1 (type 2 is easier to treat)	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	1 (3%)		0 (0%)	0 (0%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	
3	6 (17%)		0 (0%)	3 (23%)	2 (17%)	0 (0%)	0 (0%)	1 (25%)	
4	16 (46%)		1 (50%)	6 (46%)	4 (33%)	3 (75%)	0 (0%)	2 (50%)	
5 (type 2 is harder to treat)	12 (34%)		1 (50%)	4 (31%)	5 (42%)	1 (25%)	0 (0%)	1 (25%)	
Hyperlipidaemia		0.001							0.74
1 (type 2 is easier to treat)	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	2 (6%)		0 (0%)	1 (8%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	
3	8 (23%)		0 (0%)	1 (8%)	5 (42%)	1 (25%)	0 (0%)	1 (25%)	
4	12 (34%)		1 (50%)	6 (46%)	1 (8%)	2 (50%)	0 (0%)	2 (50%)	
5 (type 2 is harder to treat)	13 (37%)		1 (50%)	5 (39%)	5 (42%)	1 (25%)	0 (0%)	1 (25%)	
Angina		0.001							0.74
1 (type 2 is easier to treat)	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	3 (9%)		0 (0%)	2 (15%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	
3	15 (44%)		0 (0%)	6 (46%)	5 (42%)	3 (75%)	0 (0%)	1 (33%)	
4	7 (21%)		1 (50%)	3 (23%)	3 (25%)	0 (0%)	0 (0%)	0 (0%)	
5 (type 2 is harder to treat)	9 (27%)		1 (50%)	2 (15%)	3 (25%)	1 (25%)	0 (0%)	2 (67%)	
Heart Failure		0.14							0.55
1 (type 2 is easier to treat)	3 (9%)		0 (0%)	3 (23%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	6 (18%)		0 (0%)	3 (23%)	2 (17%)	1 (25%)	0 (0%)	0 (0%)	
3	12 (35%)		0 (0%)	3 (23%)	6 (50%)	2 (50%)	0 (0%)	1 (33%)	
4	5 (15%)		1 (50%)	2 (15%)	2 (17%)	0 (0%)	0 (0%)	0 (0%)	
5 (type 2 is harder to treat)	8 (24%)		1 (50%)	2 (15%)	2 (17%)	1 (25%)	0 (0%)	2 (67%)	
Arthritis		0.001							0.12
1 (type 2 is easier to treat)	1 (3%)		0 (0%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	4 (12%)		0 (0%)	3 (23%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	
3	16 (47%)		0 (0%)	6 (46%)	8 (67%)	1 (25%)	0 (0%)	1 (33%)	
4	6 (18%)		1 (50%)	2 (15%)	3 (25%)	0 (0%)	0 (0%)	0 (0%)	
5 (type 2 is harder to treat)	7 (21%)		1 (50%)	1 (8%)	0 (0%)	3 (75%)	0 (0%)	2 (67%)	

† Chi-squared test for equal proportions used on proportions of each rating answer.

‡ Chi-squared test for equal proportions used on distributions of proportions for each profession.

There is evidence that the distributions for each disease except heart failure do not contain equal proportions and it appears that in general the HCP's view type 2 diabetes as harder to treat. There is no evidence of any differences in the distributions of proportions between the profession groups.

Table 8.2: Severity of type 2 diabetes by treatment.

	Profession								p-value‡
	All	p-value†	PM's	GP's	PN's	Pod's	Dietn's	DN's	
Diet Alone		<0.001							0.86
1 (not at all serious)	1 (3%)		0 (0%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	2 (6%)		0 (0%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	1 (25%)	
3	9 (26%)		0 (0%)	4 (31%)	4 (33%)	1 (25%)	0 (0%)	0 (0%)	
4	10 (29%)		0 (0%)	4 (31%)	2 (17%)	2 (50%)	0 (0%)	2 (50%)	
5 (very serious)	13 (37%)		1 (100%)	3 (23%)	6 (50%)	1 (25%)	1 (100%)	1 (25%)	
Tablets		<0.001							0.68
1 (not at all serious)	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	5 (14%)		0 (0%)	3 (23%)	1 (8%)	0 (0%)	0 (0%)	1 (25%)	
4	15 (43%)		0 (0%)	7 (54%)	4 (33%)	2 (50%)	0 (0%)	2 (50%)	
5 (very serious)	15 (43%)		1 (100%)	3 (23%)	7 (58%)	2 (50%)	1 (100%)	1 (25%)	
Insulin		<0.001							0.53
1 (not at all serious)	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	1 (3%)		0 (0%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
4	8 (23%)		0 (0%)	2 (15%)	2 (17%)	1 (25%)	0 (0%)	3 (75%)	
5 (very serious)	26 (74%)		1 (100%)	10 (77%)	10 (83%)	3 (75%)	1 (100%)	1 (25%)	

† Chi-squared test for equal proportions used on proportions of each rating answer.

‡ Chi-squared test for equal proportions used on distributions of proportions for each profession.

There is evidence that the distributions for each treatment method do not contain equal proportions and it appears that in general the HCP's view all treatment methods as serious. There is no evidence of any differences in the distributions of proportions between the profession groups.

Table 8.3: Confidence in management of type 2 diabetes.

1 (very confident)	2	3	4	5 (not confident)	p-value
8 (24%)	10 (29%)	8 (24%)	7 (21%)	1 (3%)	0.14

Chi-squared test for equal proportions used. There is no evidence that the proportions are not equal. HCP's appear not to feel strongly in either direction.

Table 8.4: Confidence in management of type 2 diabetes linked to training.

	1 (enough training)	2	3	4	5 (not enough training)
1 (very confident)	4 (50%)	3 (38%)	1 (13%)	0 (0%)	0 (0%)
2	0 (0%)	4 (40%)	3 (30%)	3 (30%)	0 (0%)
3	0 (0%)	3 (38%)	2 (25%)	3 (38%)	0 (0%)
4	1 (14%)	2 (29%)	0 (0%)	4 (57%)	0 (0%)
5 (not confident)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)

Chi-squared test for linear trend p-value = 0.004 so there is evidence of an association between the HCP's views on their training and their confidence in management of type 2 diabetes. It appears that HCP's that feel they have enough training also feel confident in management of the disease.

Table 8.5: Confidence that own therapeutic actions/ advice result in improved outcomes.

1 (strongly agree)	2	3	4	5 (strongly disagree)	p-value
8 (24%)	11 (32%)	8 (24%)	6 (18%)	1 (3%)	0.09

Chi-squared test for equal proportions used. There is no evidence that the proportions are not equal. HCP's appear not to feel very strongly about this although they tend to agree more than disagree.

Table 8.6: Confidence in therapeutic actions/ advice linked to training.

	1 (enough training)	2	3	4	5 (not enough training)
1 (very confident)	3 (38%)	3 (38%)	2 (25%)	0 (0%)	0 (0%)
2	1 (9%)	6 (55%)	1 (9%)	3 (27%)	0 (0%)
3	0 (0%)	3 (38%)	2 (25%)	2 (25%)	1 (13%)
4	1 (17%)	0 (0%)	1 (17%)	4 (67%)	0 (0%)
5 (not confident)	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)

Chi-squared test for linear trend p-value = 0.004 so there is evidence of an association between the HCP's views on their training and their confidence that their actions/advice result in improved outcomes. It appears that HCP's that feel they have enough training also feel confident in their actions/ advice.

Table 8.7: Training capacity.

	Profession								p-value‡
	All	p-value†	PM's	GP's	PN's	Pod's	Dietn's	DN's	
1 (enough training)	5 (15%)	0.03	1 (100%)	2 (18%)	1 (8%)	1 (20%)	0 (0%)	0 (0%)	0.65
2	12 (35%)		0 (0%)	5 (46%)	5 (42%)	0 (0%)	1 (100%)	1 (25%)	
3	6 (18%)		0 (0%)	2 (18%)	2 (17%)	1 (20%)	0 (0%)	1 (25%)	
4	10 (29%)		0 (0%)	1 (9%)	4 (33%)	3 (60%)	0 (0%)	2 (50%)	
5 (not enough training)	1 (3%)		0 (0%)	1 (9%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	

† Chi-squared test for equal proportions used on proportions of each rating answer.

‡ Chi-squared test for equal proportions used on distributions of proportions for each profession.

There is evidence that the proportions are not equal and that in general HCP's do not feel strongly either way regarding their training. There is no evidence of any differences in the distributions of proportions between the profession groups.

Table 8.8: Adequacy of time and resources to effectively treat people with type 2 diabetes.

1 (adequate)	2	3	4	5 (inadequate)	p-value
6 (18%)	7 (21%)	6 (18%)	8 (24%)	7 (21%)	0.98

Chi-squared test for equal proportions used. There is no evidence that the proportions are not equal. HCP's appear not to feel strongly in either direction.

Table 8.9: Diabetic care requires a team approach.

1 (strongly agree)	2	3	4	5 (strongly disagree)	p-value
23 (68%)	4 (12%)	1 (3%)	1 (3%)	5 (15%)	<0.001

Chi-squared test for equal proportions used. There is evidence that the proportions are not equal. HCP's appear to feel strongly that a team approach is required but 5 HCP's have strongly disagreed with the idea.

Table 8.10: Patient centred care can improve adherence to recommended healthcare of type 2 diabetic patients.

1 (strongly agree)	2	3	4	5 (strongly disagree)	p-value
16 (46%)	7 (20%)	6 (17%)	3 (9%)	3 (9%)	0.003

Chi-squared test for equal proportions used. There is evidence that the proportions are not equal. HCP's appear to feel strongly that patient centred care can improve adherence.

Table 8.11: Patient centred care views linked to importance of recording results from patient held records.

	1 (does improve)	2	3	4	5 (does not improve)
1 (not important)	1 (7%)	1 (7%)	7 (47%)	3 (20%)	3 (20%)
2	0 (0%)	0 (0%)	4 (57%)	0 (0%)	3 (43%)
3	0 (0%)	2 (33%)	2 (33%)	1 (17%)	1 (17%)
4	0 (0%)	1 (33%)	1 (33%)	1 (33%)	0 (0%)
5 (very important)	0 (0%)	0 (0%)	0 (0%)	2 (67%)	1 (33%)

Chi-squared test for linear trend p-value = 0.63 so there is no evidence of an association between the HCP's views on the importance of patient held records and on the usefulness of patient centred care.

Use of clinical guidelines

As clinical guidelines in diabetes were among the first to be developed, professionals were asked about their use. Results are presented in Tables 9.1- 9.4 inclusive.

Table 9.1: Level of organisational support from practice towards use of guidelines.

1 (very little)	2	3	4	5 (very high support)	p-value
1 (3%)	1 (3%)	8 (23%)	4 (43%)	10 (29%)	<0.001

Chi-squared test for equal proportions used. There is evidence that the proportions are not equal and it appears that in general HCP's rate the level of support as high.

Table 9.2: Clinical guidelines affect the degree to which consultations are patient centred.

	Profession								p-value‡
	All	p-value†	PM's	GP's	PN's	Pod's	Dietn's	DN's	
1 (strongly agree)	3 (9%)	0.002	1 (50%)	0 (0%)	1 (8%)	0 (0%)	0 (0%)	1 (33%)	0.14
2	7 (21%)		0 (0%)	3 (25%)	3 (25%)	1 (20%)	0 (0%)	0 (0%)	
3	14 (44%)		1 (50%)	9 (75%)	3 (25%)	2 (40%)	0 (0%)	0 (0%)	
4	8 (24%)		0 (0%)	0 (0%)	4 (33%)	2 (40%)	0 (0%)	2 (67%)	
5 (strongly disagree)	1 (3%)		0 (0%)	0 (0%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	

† Chi-squared test for equal proportions used on proportions of each rating answer.

‡ Chi-squared test for equal proportions used on distributions of proportions for each profession.

There is evidence that the distribution does not contain equal proportions and it appears that in general the HCP's generally do not agree or disagree strongly with the statement. There is no evidence of any differences in the distributions of proportions between the profession groups.

Table 9.3: Benefits of clinical guidelines.

	1 (not a benefit)	2	3	4	5 (very much a benefit)	p-value
Keeps you up to date with research findings	0 (0%)	0 (0%)	4 (12%)	17 (50%)	13 (38%)	<0.001
Access to research findings	0 (0%)	1 (3%)	10 (29%)	14 (40%)	10 (29%)	<0.001
Saves time reading research papers	1 (3%)	4 (11%)	7 (20%)	16 (46%)	7 (20%)	0.001
Shows how to apply research in practice	1 (3%)	0 (0%)	11 (31%)	15 (43%)	8 (23%)	<0.001
Aid to clinical decision making	0 (0%)	0 (0%)	6 (17%)	18 (51%)	11 (31%)	<0.001

Chi-squared test for equal proportions used. There is evidence that the distributions for each benefit do not contain equal proportions and it appears that in general HCP's rate all issues as beneficial.

Table 9.4: Barriers to clinical guidelines.

	1 (not a barrier)	2	3	4	5 (very much a barrier)	p-value
No time to read	7 (20%)	1 (3%)	3 (9%)	16 (46%)	8 (23%)	0.001
Relevant literature not accessible	6 (17%)	5 (14%)	17 (49%)	6 (17%)	1 (3%)	<0.001
Lack of time to implement new ideas on the job	3 (9%)	0 (0%)	16 (46%)	10 (29%)	6 (17%)	<0.001
Facilities are inadequate for implementation	3 (9%)	8 (23%)	14 (40%)	8 (23%)	2 (6%)	0.01
Organisation will not cooperate with implementation	7 (20%)	10 (29%)	9 (26%)	6 (17%)	3 (9%)	0.37
Ability to evaluate quality of research	5 (14%)	3 (9%)	13 (37%)	7 (20%)	7 (20%)	0.09
Little understanding of statistics	4 (11%)	4 (11%)	14 (40%)	6 (17%)	7 (20%)	0.046
Adverse effect on relationship with patient	5 (14%)	8 (23%)	19 (54%)	2 (6%)	1 (3%)	<0.001

Chi-squared test for equal proportions used. There is evidence that the distributions for all barriers except two do not contain equal proportions. It appears that in general HCP's feel that a lack of reading time is the greatest barrier to using clinical guidelines.

Discussion

Health care systems and processes of care

Within this LHCC the population of people with diabetes is fully identified through use of computerised record systems, predominantly the GPASS system, through which annual recall for patient review is achieved. For the small number of practices without the GPASS system, annual review is achieved through use of VISION, previous clinic sheets, and box file records.

The number of patients registered with type 2 diabetes in this LHCC increased by 120 people within the study period, from 1402 at baseline, to 1522 by the end of the study. This equates to an increase in identified prevalence of the condition of 0.2%: 2.2% at baseline and 2.4% in the follow up (Table 1.1).

At the start of the study the majority of practices had begun to implement level 3 care, and by the end all practices were delivering this level of service. Patients' experiences of this change in service were explored through focus group discussions and their perceptions are presented in the focus group section of this report. One of the

requirements of level 3 care is staff attendance at accredited diabetic training which has been met by all practices. Hence each practice has a named lead GP and Practice Nurse for diabetes care.

Study Sample

Forty one percent (n=576) of the population of people with type 2 diabetes were invited to participate in the study through the sampling strategy described in the methodology section, of which 140 agreed to participate (10% of the population). In hindsight had a larger number been invited then a larger and more representative study sample may have been obtained. However due to time constraints and the necessity to get the study underway reminder letters were sent to all non respondents but further recruiting was not undertaken.

Although there is no significant difference in the mean age of the sample group and the population (65.4yrs and 63.8yrs respectively), there are significant differences in the breakdown of age categories with a higher representation of 65-74 year olds in the sample group and a smaller representation of under 64 year olds and over 75 year olds. This may be due in part to work commitments of under 64 year olds and age restrictions of over 75 year olds restricting ability or willingness to participate in the study.

Again, a significant difference is noted in the deprivation categories of the sample and population groups with a higher percentage of deprecats 1 to 5 represented in the sample, and a smaller representation of deprecats 6 and 7 (Table 2.1).

The percentage of patients from an Asian ethnic background in the population is 18% whereas that in the sample is 6%. This is in spite of stratified sampling to ensure representation of this client group, and may be partially due to language barriers especially in the older age group.

Due to the differences in age category, deprivation category and ethnic origin the sample is not fully representative of the population.

Patient questionnaires

Results from the SF-36 questionnaire which measures general health and well being, and the PAID questionnaire which is a diabetes-specific measurement of distress show no difference in these measures for the whole sample group between baseline and follow up (Table 3.1). The only exception to this is in the score for bodily pain where a mean difference of -6.44 is noted (in the scale of 0-100). Respondents were encouraged to add any of their own comments to these questionnaires which many did, and frequent reference was made to musculoskeletal conditions such as arthritis and joint replacements as the cause of bodily pain.

The median PAID score at baseline and follow up remained stable at 13 (Table 3.2). The score generated by PAID is on a scale from 0-100, with 100 representing a high level of

distress and 0 representing a low level of distress caused by living with diabetes. Therefore it would appear that within the sample there is a good level of coping with the condition.

Appendices 1 and 2 break down questionnaire responses for females and males. The only statistically significant difference is a slight worsening in the measurement of mental health for males (mean difference in score = -4.23)

Appendices 3-6 break down responses as per age categories of respondents. Statistically significant differences are highlighted in bold. For the under 55 year old age group significant worsening is seen in Role limitation physical, Social function and General Health.

No significant difference in scores was found in the 55-64 year old age group, while the only significant difference in the 65-74 yr old's was in the measurement of the PAID score with a mean increase in score of 2.56 points.

Scores from patients in the >74 age group show significant worsening in Physical function, Role limitation physical, Energy/Vitality and Bodily pain. Again this may be due in part to co-morbidity factors such as musculoskeletal conditions. The PAID score for this group also shows a mean increase of 4.51 points.

Appendices 7-9 break down questionnaire results for deprivation categories 1&2, 3-5 and 6&7. No statistically significant differences are noted for respondents from deprecats 3 to 7. For respondents from deprecats 1&2 significant worsening is noted in Physical function, Role limitation physical, Energy/Vitality and Bodily pain.

Patients' clinical data

This section refers to Tables 4.1-4.3 and Appendices 10- 19. Baseline and follow up clinical data was obtained retrospectively from computer and manual records. Baseline data was taken from the nearest record to January 2002, and follow up data from the nearest record to December 2003.

Statistically significant improvements for the entire sample were found in levels of random blood glucose, cholesterol, HDL, systolic blood pressure and diastolic blood pressure.

Table 4.2 outlines other clinical results. As can be seen in the table there is a significant improvement in smoking status and levels of physical activity for the sample group as a whole. There is also a significant worsening in the presence of the right pedal pulse. There were no statistically significant findings in referral to smoking cessation clinics or exercise classes. There were no prescriptions given for nicotine replacement therapy (NRT). It is acknowledged however that concomitantly with this study, there was a local initiative through pharmacies to provide NRT free for 3 months. This did not result in any

ongoing prescriptions beyond that time.

In the breakdown of results for females it can be seen that although random blood glucose, cholesterol, HDL, and diastolic blood pressure significantly improved, there is no significant change in systolic blood pressure or quality of life issues (Appendix 11). Systolic blood pressure remains borderline at both time points: 141.92mmHg at baseline and 139.02mmHg at follow up.

Statistically significant paired clinical results for males does not include absence of right pedal pulse (Appendix 12) although 10% of pairs show absence of same at follow up.

For those in the <55 yr age group the statistically significant improvements were seen in random blood glucose levels, total cholesterol and smoking status (Appendix 13). Appendix 14 shows results for the 55-64 yr age group – statistically significant improvement is seen in HDL levels, and Body mass Index sees a statistically significant worsening from a mean of 30.5 to a mean of 31.6.

In the 65-74 age group the statistically significant improvements were seen in random blood glucose, total cholesterol, HDL and diastolic blood pressure (Appendix 15) whereas in the >75 age group the only statistically significant differences were improvements in total cholesterol and in systolic blood pressure (Appendix 16).

Appendix 17 shows that the only statistically significant differences for those in deprivation categories 1 & 2 are improvements in random blood glucose, total cholesterol and HDL. This is also true for those in deprivation categories 3 to 5 (Appendix 18). However results for deprecats 6&7 also show a statistically significant improvement in HbA1c levels (mean of 8.58 at baseline and 7.74 at follow up), and also in random blood glucose, total cholesterol and smoking status (Appendix 19).

Table 4.3 shows the percentages of results which were within the range of recommended guidelines at baseline and at follow up. It can be seen that there is a statistically significant improvement in the results for total cholesterol and blood pressure in line with recommended guidelines.

Medication prescriptions

While certain clinical parameters had improved, others showed statistical significance. On interrogating the data to determine if there had been increased prescriptions of new drugs or increased prescription of current dosages, several areas were identified (Tables 5.1-5.9).

There was a significant increase in the prescribing dose of Gliclazide to patients that were on the drug at both baseline and follow up. There was a statistically significant increase in the prescribing of Metformin. This was true for the increase in dose and the frequency of prescription.

While there was an increase in the number of patients who required insulin from baseline to follow up, this was not statistically significant.

There was a significant increase in the proportion of patients that were prescribed some form of diabetes medication and could suggest that this was due to improved management from the new service. There was a statistically significant difference between baseline and follow up of the number of diabetes drugs prescribed to patients.

There was statistical significance in the prescribing of all Ace inhibitors, ARAs, hypertensive drugs, statins and aspirin.

When linked to clinical parameters, prescriptions to address hypertension and cholesterol were the only statistically significant results.

Hence, the prescription of drugs is improving clinical parameters around hypertension and the treatment of cholesterol. While diabetes related drugs have shown increased usage, there is no causal link between this and the improved HbA1c results noted.

It must be noted however that although there was an improvement of HbA1c, there was no increase of BMI. Normally, when a person improves their glycaemic control, this is at the expense of their weight gaining. While not statistically significant, there may be benefit in a less aggressive approach to improvement of glycaemic control if it maintains body weight.

Health care professionals perceptions

Statistical analysis of the healthcare professionals' questionnaire highlighted a number of strong perceptions (Table 7.1, Appendices 20-24). Overall the responses show a high level of satisfaction with the new system of care delivery for patients with Type 2 diabetes. A patient centred, and team approach is perceived as very important, as well as tight management in terms of annual monitoring and advice. The management of diabetes is perceived as harder than some other chronic conditions, and diabetes-specific training is valued for increasing confidence in the management of it. Referral to other professionals is valued as important also.

Conclusions

The introduction of community based care for people with type 2 diabetes within this LHCC is not compromising individuals' health status or care management. Indeed significant improvements are noted in key clinical indices including blood pressure and cholesterol levels. Patients' general health status and coping with diabetes remain largely unchanged.

Medications were prescribed to address clinical issues of diabetes, hypertension,

cholesterol and when analysed according to clinical parameters demonstrated links with improvements of blood pressure and cholesterol levels.

Health care professionals perceive type 2 diabetes to be a serious condition and value the importance of tight clinical management. Diabetes-specific training was valued, and there is overall a high level of satisfaction among health care professionals with the new system of care.

Patients' perspectives of the new service will now be discussed in the following section: focus group sub study.

Focus group sub study: Perceptions of service users

Aim

To explore the perceptions and experiences of adults with type 2 diabetes of a restructuring of their diabetes service from secondary to primary care and of living with diabetes.

Sample

The sample was acquired from the Greater Shawlands LHCC which consisted of 14 GP practices. It is recommended that a sample for qualitative research is not prespecified in strict terms lest important data sources be overlooked and so purposive sampling is often used. The aim of this study was to explore service users' perceptions and experiences so a range of participants was sought to represent different ages, genders and ethnic backgrounds in order to explore a range of perspectives. With this in mind people were selected to meet identified criteria from GP's diabetes registers. Inclusion criteria were adults with type 2 diabetes for at least 2 years. Exclusion criteria were people who had type 1 diabetes or who were younger than 18 years. Fourteen people were selected from each register and in total, 35 people consented to take part in the focus group study.

Methodology

Patients were selected from GP practices and focus groups were held per practice. The focus group discussions were conducted in two phases – five in the autumn of 2003 with participants (n= 23) from five GP practices who were in the early stages of implementing the new diabetes service, and a further three in the autumn of 2004 with participants (n=12) from three GP practices who had been providing the new service for the longest time (approximately two years). The sample was sent an invitation letter and this was followed up a week later with a telephone call from one of the researchers to acquire consent and answer any questions.

Concurrent data collection and thematic analysis was conducted by 3 researchers for

credibility and reliability. The study used a phenomenological approach, and interpretivism was used to analyse the qualitative data generated by the focus groups. Each discussion lasted for between 60 and 90 minutes and was moderated by a lead researcher. A topic guide was used as a prompt to encourage discussion and flexibility was also employed to let participants direct the conversation to matters that interested and concerned them. Further areas for exploration were thereby identified for subsequent groups. A research assistant was present along with the lead researcher to help with logistical matters and take field notes.

Analysis

Tape recordings of each focus group were transcribed verbatim, and the transcripts, along with the tapes and field notes, formed the findings.

The data was analysed both during and after collection. The topic guide served as an aid to analysis. Thematic analysis was used whereby sections of transcripts which related to the areas of topic under study were pulled together, and thereafter separated into sections and categories. Analysis of the content of the first three focus groups indicated that saturation, which is the point at which further observations yield minimal or no new information, had not been reached. Therefore a further 2 groups were planned and conducted in this initial phase and saturation reached. In the second phase of the study saturation was achieved early after 2 focus groups but a 3rd was conducted for confirmation.

The 5 earlier focus groups were analysed in depth together and thereafter the 3 latter groups. It became clear that there was no new material in the latter groups and hence the findings are presented together.

Investigator triangulation was used to validate findings. Member checking was also employed to validate findings and to improve the rigour of the research. All participants were given a written summary of the findings and were invited to attend a feedback session where findings were presented. Participants were encouraged to make comments and were provided with a response sheet to make anonymous written comments if they so wished. This process proved useful in clarifying and confirming the findings.

Results

Six major themes emerged from the analysis: Impact of organisational change, Location and process of care, Perceptions of care, Living with diabetes, Motivation to participate in care and Education and information.

Impact of organisational change

Various attitudes towards the change in service became evident, such as acceptance, cautious expectation, and also a positive outlook:

“As long as you are still getting the same service, I don’t see why it should bother anybody.”

“ ...it is important to know that you have other options if you are not happy. But I’ve always found the practice to be very good so I would certainly come along and see what happens.”

The view was expressed that the driver for change was service improvement, and familiarity with healthcare staff was appreciated:

“I was told it was to provide a better service.”

“...you know your own nurse and you know the doctor, and they give you a better chance...”

It was also perceived by some that the reasons for the change in service may be financial:

“... is this part of the larger Glasgow plan to reduce the number of hospitals and so on?”

Location and Process of Care

For both models of care participants discussed factors that contributed to levels of convenience and comfort such as location, numbers of other people at clinics, and waiting times involved at appointments.

The new service was welcomed for its convenience, with smaller numbers of other people present at the clinics and with more time available to spend in consultation.

“..it’s obviously far more convenient...you don’t have the numbers that you have at the hospital. Here...it just runs through.”

“When you went to the hospital...you sat in a waiting room. And you went back and forward and back and forward. You’re talking a full morning or afternoon.”

Perceptions of care

Within the new model participants felt more relaxed with healthcare staff. They felt able to ask questions and discuss concerns, and were confident of referral to specialists if it is necessary:

“..it’s faces that you know and I feel quite relaxed and I feel I can ask her things and she’s very nice.”

“They know me. It’s on a more personal basis.”

“I know they can refer me to the hospital if they’re not sure about something.”

In contrast some found the hospital setting intimidating, and felt rushed and unable to ask questions:

“I think when you go to the hospital, it’s just a face, with a name. ... they are only interested in one thing, and that’s what you’ve got, whether it’s diabetes or it’s something else, then that’s what they stick to. ...a lot of people are frightened to go to the hospital, and would rather go to their own GP.”

However, the hospital service was perceived as specialised, up to date and reassuring:

‘I found the hospital very good...because they gave me a great deal of information and a lot of support to begin with at the annual checks... they are pretty up to date.’

“I felt I was being very carefully looked after.”

Concerns were raised by some participants about the accessibility of expertise and information in the general setting:

“ Just one concern I have was that...you feel that the hospital is a centre of expertise and you kind of worry a wee bit...”

These concerns were balanced with the view that primary healthcare professionals had undergone further educational diabetes training in order to provide the new service:

“..they are pretty well informed...out in the community.”

“I would ask the nurse, cause I know now she’s up in it, very well qualified to talk about it.”

Concerns also touched upon specific aspects of service provision that people valued in the old model and did not wish to lose such as annual check, and provision of a feedback letter with test results:

“ ... if you’re moving it from a centre and you’re offering what is perceived to be a better service, in your own practice, then you’ll be looking for something more ... more frequently rather than annually.”

“... you got a letter back from the hospital telling all of your results. You don’t get that from the (GP).”

Living with Diabetes

Participants expressed awareness of the seriousness of diabetes and discussed the impact of being diagnosed with the condition:

“...my initial reaction was ‘why me’.”

“You automatically get a shock, and you immediately think about needles and insulin..”

The impact of diabetes on their lifestyle was discussed:

“We have to face it...we have no other option. ...It’s a big thing.”

“It dawns on you after quite a short time that you’ve got this for the rest of your life. ... You’ve got to do something about it.”

When asked what they perceived to be the worst part of living with diabetes some participants answered:

“The initial realisation, getting hit with it, and taking it all in and having to change your lifestyle and the eating habits and all the rest of it.”

Motivation to Participate in Care

Participants emphasised the central role of “self” in managing the condition:

“...yourself is the person that should be controlling it...it lies with you, how you’re diabetes goes.”

“You have to be proactive.”

“I think the bottom line must be as an individual, you must look after yourself.”

They also discussed the need for support from others in the form of understanding and information:

“..with advice, help and support you adjust to it.”

“If you are wanting to work in partnership with your doctor and control your own condition...then you want more up to date information.”

Education and Information

Formal education sessions which were provided under the hospital model of care were valued highly although due to the timing of meetings were not accessible to people working office hours. Education sessions in the new service had not been fully
Lindsay G, McDowell J, McPhail K (2006) An evaluation of the impact of the Glasgow 39
Diabetes project for healthcare for patients with type 2 diabetes. Nursing & Health Care,
University of Glasgow, Glasgow ISBN: 9780852618233

established but were considered to be desirable, especially for people newly diagnosed, and with a peer support slant:

“I think you’ve got to have something. I think newly diagnosed people obviously do require a fair degree of material upfront.”

“..we gain a lot from each other when we talk to each other.” A clear point of contact in the new service for information and expertise was also desired.

Discussion of completed project

The whole project aimed to evaluate the impact of the Glasgow Diabetes Project on healthcare for people with type 2 diabetes. There were 3 primary objectives and 5 secondary objectives that will be addressed in the discussion. These are presented on page 5.

Each of the practices (n=14) had an electronic system for identifying people with diabetes. Most practice used GPASS although a few used VISION. These IT systems identify when period reviews are required and maintain a record of medications prescribed and clinical management.

People still had contact with health care professionals in both primary and secondary care (Tables 5.10; 5.11). The goal of the project was that people with stable type 2 diabetes would be managed solely within primary care and only referred to secondary care for specialist input. There was evidence that the change process was still ongoing. This may not be unexpected in a transition period. This appeared to look, from the case notes, to be ongoing care that was already established as opposed to new referrals to secondary care.

HbA1c improved but not statistically significant however the random blood glucose improved statistically significantly (Table 4.1). The overall improvement in diabetes control, while not statistically significant was not at the expense of weight gain which is the normal expected result. Hence, the improvement is clinically beneficial for patient care.

There was a significant increase in the prescribing of Gliclazide and Metformin. While there are newer hyperglycaemic agents e.g. it is interesting to note that the well established medications were the drugs of choice. The history of metformin has changed over the years and it is good to see its increased usefulness. Current guidelines indicate that it should be the first point of management in people with type 2 diabetes. However its benefits are greater than for the newly diagnosed and this is evidenced here. We cannot make an inference between this prescribing and improvement in HbA1c.

There was a statistically significant improvement in the blood pressure and cholesterol levels with a number achieving target levels (Table 4.3, 4.7). The related factor may be the statistically significant increase in the prescribing of all Ace inhibitors, Angiotensin Receptor Antagonists, hypertensive drugs, statins and aspirin (Tables 5.5; 5.6;5.7; 5.8;

Lindsay G, McDowell J, McPhail K (2006) An evaluation of the impact of the Glasgow Diabetes project for healthcare for patients with type 2 diabetes. Nursing & Health Care, University of Glasgow, Glasgow ISBN: 9780852618233 40

5.9).

There was a statistically significant improvement in the number of people who stopped smoking during this time (Table 4.2). This significance was seen in the male population under the age of 55 years. It was discovered towards the end of the project that during this data collection period The Starting Fresh Pharmacy Project took over the prescribing of Nicotine Replacement Therapy free with the maximum duration of the course being 12 weeks. During this time, the LHCC employed a smoking cessation co-ordinator who ran clinics in several locations. It is unknown if people took up this offer. However, it could be assumed that if someone commenced nicotine replacement therapy and found it beneficial, they would ask their GP for a prescription for continuation. It is noted that there were no prescriptions for nicotine replacement therapy for any patients in this study or any record of health care interventions/advice to promote smoking cessation.

There was a statistically significant improvement in the number of people who improved their exercise levels during this time. Only a few people were referred to an exercise referral scheme (page 18) and hence there is no cause and effect evident. The few referrals made for exercise were from the one practice.

Patients' appreciated the new service because of its convenience and patient centered focus. They had confidence in the health care team for referral to specialist services if needed. There were very few default rates from both primary and secondary care although rates were higher at the hospital clinic (Tables 5.10; 5.11).

Patients' general health did deteriorate but due to other conditions, not diabetes. In the whole study population, although there was a trend for general lower health status this was only significant in relation to bodily pain (Table 3.1) People indicated that this was due to other concomitant chronic illnesses. Men had a significant deterioration in their mental health score. Women, across all ages, remained the same in all the domains of health (Appendices 1, 2). There was no statistically significant reduction in reported deterioration in health status for patients in the highest area of economic deprivation (Appendix 9). There were statistically significant deteriorations in those people from the most affluent areas (Appendix 7). It is noted that those in deocat areas 6 and 7 had lower baseline health scores compared to those in deocat 1 and 2 however, those in deocat areas 6 and 7 did not deteriorate.

On subgroup analysis there was statistically significant deterioration in several health domains for the under 55 year olds and the over 74 year olds regardless of gender. This may reflect the challenges facing the normally economically active population and the health issues associated with ageing.

Patients' attitudes to coping with diabetes stayed the same no matter where their care was delivered. They expressed concern that their annual review would be extended beyond a year due to increasing number of people with diabetes. Patients stated that they would

like more education about self management of diabetes. Some patients had experience of a 6 week programme offered from secondary care for people newly diagnosed and referred to secondary care. The need for education and information to be available was seen as being particularly strong at diagnosis, but also ongoing, and a clear point of contact for such was sought. They highly valued access to up to date information and expertise to enable them to manage their own condition. Patients also requested that they be given a written record of their results so that they could compare these with previous years.

Overall the participants who took part in this focus group study appreciated the change in service delivery. Their local GP surgery was more geographically convenient and they felt that they were 'known' by the staff in the GP surgery where they also received holistic care. This was in contrast to the hospital where they felt that they were seen only for their diabetes and that time constraints worked against building up relationships with the healthcare professionals. Some concerns were aired around the generalist versus specialist debate. In discussion, it was acknowledged that the primary care professionals had undergone additional educational preparation and hence they had confidence in the referral system should individual people require this.

As people volunteered to take part in focus groups, it is not surprising that they all had a very strong internal locus of control about their diabetes. All stated that they personally were primarily responsible for their diabetes management and that it was not health care professionals who were responsible.

Interestingly no new findings were found between patients perceptions in the early stages of the new service and also 2 years on. This may indicate that patients are satisfied with the new delivery of service, albeit may have had minimal contact due to the annual nature of the clinics. Alternatively, from above, it appears to be that the service is still undergoing change in practice and people, in addition to being seen in secondary care, are also being seen in primary care and so could be seeing health care professionals more frequently.

Professionals' perceptions questionnaire showed a high level of satisfaction with the new service. In general, professionals view type 2 diabetes harder to treat when compared with people who have hypertension, hyperlipidaemia, angina, heart failure, arthritis.

Conclusion

In conclusion this study demonstrates that for these people, the change in service delivery is welcomed provided patient requests for education and a record of their results are put in place and an annual review maintained. In addition it is evident that the new model of care is beneficial with significant improvements in a range of clinical indices of good diabetes management. However, because patients were still being seen by both systems of care it is difficult to differentiate the impact of each separate service.

Recommendations for practice

1. Patient education programmes are initiated for the newly diagnosed in the first instance in primary care.
2. Ongoing patient education in primary care is made available.
3. Patients are given a record of their key clinical parameters at each visit and encouraged to meet targets
4. An annual review of clinical parameters is maintained.
5. That there is a more proactive approach to discharging patients from secondary care.
6. Advice about smoking cessation or referral to specialist services should be recorded in clinical notes.
7. Good management was observed within GP practices and efforts to sustain and develop this activity should be supported.
8. The project should be re-evaluated in 5 years time to ensure that the transition period has been completed and that there is no duplication of service delivery.

Dissemination

Findings have been disseminated through various means throughout the course of the study including poster presentations and concurrent sessions at conferences. The focus group findings were presented at a concurrent session at the Caring for Glasgow Nursing Conference in May 2004. Findings of the clinical data study were also presented at a concurrent session at the Annual International Nursing Research conference in Belfast in March 2005. At this same conference a poster presentation was made of the focus group study also. In April 2005, a presentation of the clinical data was made in the Division of Nursing and Midwifery, University of Glasgow, and in May 2005 to the Greater Shawlands LHCC.

Articles are in the process of being written for publication that are at various stages of acceptance by journals.

Paired results for females: Appendix 1

	No Pairs	Baseline†	1 yr follow up†	Mean difference‡	p-value	95% CI for diff
Physical Function	36	73 (46 - 80)	63 (46 - 80)	-4.72	0.25	-12.83 to 3.39
Role Limitation Physical	36	50 (0 - 100)	25 (0 - 100)	-9.03	0.24	-24.31 to 6.26
Role Limitation Mental	36	67 (25 - 100)	100 (0 - 100)	-3.69	0.60	17.80 to 10.41
Social Function	36	78 (56 - 100)	78 (56 - 100)	-3.08	0.48	-11.87 to 5.71
Mental Health	36	66.11 (22.54)	67.67 (21.69)	1.56	0.46	-2.65 to 5.77
Energy / Vitality	36	47.50 (24.86)	47.36 (21.76)	-0.14	0.97	-7.10 to 6.83
Bodily Pain	36	67.33 (25.71)	59.00 (29.01)	-8.33	0.08	-17.60 to 0.94
General Health	36	53.36 (26.44)	52.58 (22.43)	-0.78	0.80	-7.05 to 5.50
PAID	38	13 (5 - 27)	13 (6 - 27)	1.05	0.55	-2.44 to 4.55

† Figures are mean (st dev) for mental health to general health and median (interquartile range) for physical function to social function and PAID [due to skewed distributions].

‡ Figures are mean for all [as distributions of differences are not skewed].

Paired results for males: Appendix 2

	No Pairs	Baseline†	1 yr follow up†	Mean difference‡	p-value	95% CI for diff
Physical Function	52	75 (50 - 95)	78 (41 - 90)	-2.98	0.24	-8.01 to 2.05
Role Limitation Physical	52	100 (0 - 100)	75 (0 - 100)	-7.21	0.20	-18.43 to 4.01
Role Limitation Mental	52	100 (33 - 100)	100 (33 - 100)	1.27	0.82	-9.92 to 12.46
Social Function	52	89 (59 - 100)	78 (44 - 100)	-5.79	0.08	-12.47 to 0.67
Mental Health	52	75.38 (20.20)	71.15 (20.90)	-4.23	0.02	-7.74 to -0.72
Energy / Vitality	52	54.13 (23.72)	49.90 (23.67)	-4.23	0.09	-9.11 to 0.65
Bodily Pain	52	72.50 (28.36)	67.37 (29.40)	-5.13	0.12	-11.56 to 1.29
General Health	52	55.79 (22.67)	51.10 (23.58)	-4.69	0.09	-10.14 to 0.75
PAID	56	12 (6 - 23)	13 (6 - 27)	2.03	0.17	-0.90 to 4.96

† Figures are mean (st dev) for mental health to general health and median (interquartile range) for physical function to social function and PAID [due to skewed distributions].

‡ Figures are mean for all [as distributions of differences are not skewed].

Paired results for <55yrs: Appendix 3

	No Pairs	Baseline†	1 yr follow up†	Mean difference‡	p-value	95% CI for diff
Physical Function	15	75 (55 - 100)	80 (20 - 95)	-9.33	0.06	-19.09 to 0.42
Role Limitation Physical	15	100 (0 - 100)	50 (0 - 100)	-16.67	0.045	-32.94 to -0.40
Role Limitation Mental	15	100 (0 - 100)	33 (0 - 100)	-6.67	0.57	-31.03 to 17.69
Social Function	15	89 (33 - 100)	67 (11 - 100)	-15.53	0.006	-25.90 to -5.17
Mental Health	15	59.47 (28.72)	56.27 (26.98)	-3.20	0.41	-11.37 to 4.93
Energy / Vitality	15	41.67 (27.50)	41.33 (26.69)	-0.33	0.92	-6.99 to 6.34
Bodily Pain	15	68.27 (25.20)	57.87 (37.22)	-10.40	0.19	-26.54 to 5.74
General Health	15	50.27 (26.45)	41.40 (6.66)	-8.67	<0.001	-12.96 to -4.77
PAID	18	25 (11 - 46)	23 (13 - 43)	0.69	0.86	-7.60 to 8.99

† Figures are mean (st dev) for mental health to general health and median (interquartile range) for physical function to social function and PAID [due to skewed distributions].

‡ Figures are mean for all [as distributions of differences are not skewed].

Paired results for 55-64 yrs: Appendix 4

	No Pairs	Baseline†	1 yr follow up†	Mean difference‡	p-value	95% CI for diff
Physical Function	17	75 (43 - 90)	80 (63 - 93)	8.52	0.19	-4.57 to 21.63
Role Limitation Physical	17	100 (13 - 100)	100 (50 - 100)	11.77	0.29	-11.01 to 34.54
Role Limitation Mental	17	100 (46 - 100)	100 (67 - 100)	6.35	0.46	-11.56 to 24.27
Social Function	17	89 (56 - 100)	78 (67 - 100)	3.88	0.54	-9.22 to 16.99
Mental Health	17	66.82 (22.13)	67.53 (20.09)	0.71	0.79	-4.84 to 6.26
Energy / Vitality	17	52.35 (27.96)	52.35 (26.52)	0.00	1.00	-13.51 to 13.51
Bodily Pain	17	66.06 (30.15)	68.06 (25.83)	2.00	0.74	-10.55 to 14.55
General Health	17	52.29 (24.84)	55.82 (29.43)	3.53	0.48	-6.76 to 13.81
PAID	18	16 (8 - 37)	13 (9 - 36)	-2.36	0.39	-8.04 to 3.32

† Figures are mean (st dev) for mental health to general health and median (interquartile range) for physical function to social function and PAID [due to skewed distributions].

‡ Figures are mean for all [as distributions of differences are not skewed].

Paired results for 65-74 yrs: Appendix 5

	No Pairs	Baseline†	1 yr follow up†	Mean difference‡	p-value	95% CI for diff
Physical Function	39	75 (50 - 90)	70 (30 - 90)	-2.69	0.40	-9.13 to 3.75
Role Limitation Physical	39	50 (0 - 100)	50 (0 - 100)	-4.49	0.51	-18.26 to 9.29
Role Limitation Mental	39	67 (33 - 100)	100 (0 - 100)	1.49	0.81	-10.94 to 13.91
Social Function	39	89 (67 - 100)	89 (0 - 100)	-1.44	0.71	-9.08 to 6.21
Mental Health	39	75.28 (18.14)	73.64 (19.13)	-1.64	0.47	-6.24 to 2.96
Energy / Vitality	39	52.05 (23.22)	51.15 (20.82)	-0.90	0.73	-6.17 to 4.37
Bodily Pain	39	70.41 (29.39)	65.33 (28.26)	-5.08	0.18	-12.51 to 2.36
General Health	39	56.74 (24.60)	53.97 (20.81)	-2.77	0.46	-10.25 to 4.71
PAID	40	10 (5 - 17)	11 (5 - 22)	2.56	0.045	0.07 to 5.06

† Figures are mean (st dev) for mental health to general health and median (interquartile range) for physical function to social function and PAID [due to skewed distributions].

‡ Figures are mean for all [as distributions of differences are not skewed].

Paired results for >74 yrs: Appendix 6

	No Pairs	Baseline†	1 yr follow up†	Mean difference‡	p-value	95% CI for diff
Physical Function	17	65 (45 - 78)	45 (23 - 75)	-13.24	<0.001	-19.66 to -6.81
Role Limitation Physical	17	50 (13 - 100)	0 (0 - 63)	-27.94	0.013	-49.20 to -6.68
Role Limitation Mental	17	100 (17 - 100)	67 (0 - 100)	-7.82	0.52	-33.20 to 17.55
Social Function	17	78 (62 - 95)	67 (56 - 95)	-11.12	0.10	-24.40 to 2.16
Mental Health	17	78.59 (16.55)	74.82 (16.96)	-3.74	0.13	-8.77 to 1.25)
Energy / Vitality	17	57.65 (18.63)	46.76 (19.76)	-10.88	0.04	-21.05 to -0.71
Bodily Pain	17	76.53 (21.54)	62.00 (29.30)	-14.53	0.03	-27.13 to -1.93
General Health	17	56.82 (21.68)	51.47 (15.18)	-5.35	0.13	-12.53 to 1.82
PAID	18	6 (3 - 13)	9 (3 - 22)	4.51	0.02	0.76 to 8.27

† Figures are mean (st dev) for mental health to general health and median (interquartile range) for physical function to social function and PAID [due to skewed distributions].

‡ Figures are mean for all [as distributions of differences are not skewed].

Paired results for deprecats 1&2: Appendix 7

	No Pairs	Baseline†	1 yr follow up†	Mean difference‡	p-value	95% CI for diff
Physical Function	24	75 (55 - 89)	75 (51 - 84)	-5.21	0.04	-10.09 to -0.33
Role Limitation Physical	24	100 (50 - 100)	50 (6 - 100)	-26.04	0.01	-46.09 to -5.99
Role Limitation Mental	24	100 (33 - 100)	100 (42 - 100)	-2.38	0.80	-21.63 to 16.88
Social Function	24	100 (78 - 100)	89 (59 - 100)	-8.79	0.06	-17.96 to 0.38
Mental Health	24	81.00 (12.27)	77.50 (12.25)	-3.50	0.06	-7.20 to 0.20
Energy / Vitality	24	62.71 (16.22)	54.38 (20.97)	-8.33	0.02	-15.26 to -1.41
Bodily Pain	24	79.29 (19.99)	67.63 (23.71)	-11.67	0.03	-21.70 to -1.63
General Health	24	64.13 (20.61)	55.08 (18.68)	-9.04	0.02	-16.47 to -1.62
PAID	24	9 (4 - 13)	9 (4 - 18)	2.29	0.11	-0.54 to 5.13

† Figures are mean (st dev) for mental health to general health and median (interquartile range) for physical function to social function and PAID [due to skewed distributions].

‡ Figures are mean for all [as distributions of differences are not skewed].

Paired results for deprecats 3-5: Appendix 8

	No Pairs	Baseline†	1 yr follow up†	Mean difference‡	p-value	95% CI for diff
Physical Function	41	75 (55 - 88)	75 (48 - 88)	-3.05	0.23	-8.15 to 2.05
Role Limitation Physical	41	100 (75 - 100)	100 (75 - 100)	0.61	0.92	-11.93 to 13.15
Role Limitation Mental	41	75 (29 - 100)	100 (17 - 100)	6.29	0.25	-4.59 to 17.17
Social Function	41	89 (56 - 100)	89 (56 - 100)	0.51	0.88	-6.80 to 7.82
Mental Health	41	70.73 (22.99)	70.63 (22.17)	-0.10	0.96	-4.05 to 3.85
Energy / Vitality	41	51.10 (24.81)	50.24 (23.23)	-0.85	0.74	-5.94 to 4.24
Bodily Pain	41	70.51 (27.81)	67.27 (28.32)	-3.24	0.35	-10.21 to 3.72
General Health	41	55.63 (21.85)	53.63 (23.91)	-2.00	0.40	-6.79 to 2.79
PAID	42	13 (5 - 27)	14 (6 - 34)	1.28	0.44	-2.05 to 4.61

† Figures are mean (st dev) for mental health to general health and median (interquartile range) for physical function to social function and PAID [due to skewed distributions].

‡ Figures are mean for all [as distributions of differences are not skewed].

Paired results for deprecats 6&7: Appendix 9

	No Pairs	Baseline†	1 yr follow up†	Mean difference‡	p-value	95% CI for diff
Physical Function	23	50 (15 - 90)	45 (10 - 85)	-3.26	0.64	-17.31 to 10.79
Role Limitation Physical	23	25 (0 - 100)	0 (0 - 100)	-4.35	0.57	-19.86 to 11.17
Role Limitation Mental	23	67 (0 - 100)	33 (0 - 100)	-11.65	0.22	-30.89 to 7.59
Social Function	23	67 (33 - 89)	56 (22 - 78)	-9.65	0.11	21.62 to 2.31
Mental Health	23	63.30 (23.25)	60.00 (23.57)	-3.30	0.35	-10.43 to 3.82
Energy / Vitality	23	40.22 (25.78)	40.65 (22.58)	0.44	0.93	-10.14 to 11.01
Bodily Pain	23	60.87 (30.60)	54.17 (35.12)	-6.70	0.30	-19.78 to 6.39
General Health	23	43.57 (27.75)	44.74 (24.85)	1.17	0.83	-9.83 to 12.18
PAID	28	14 (8 - 35)	13 (9 - 33)	1.61	0.54	-3.69 to 6.90

† Figures are mean (st dev) for mental health to general health and median (interquartile range) for physical function to social function and PAID [due to skewed distributions].

‡ Figures are mean for all [as distributions of differences are not skewed].

Overall clinical results that have increased, decreased or stayed the same: Appendix 10

	No Pairs	Decreased		Same	Increased	
		N (%)	Mean Diff		N (%)	Mean Diff
HbA1c	113	61 (54%)	-1.52	3 (3%)	49 (43%)	1.32
RBG	56	44 (79%)	-4.14	0 (0%)	12 (21%)	2.55
Creatinine	109	63 (58%)	-14.48	3 (3%)	43 (39%)	29.07
Cholesterol	102	72 (71%)	-1.11	5 (5%)	25 (25%)	0.58
HDL	71	12 (17%)	-0.19	11 (16%)	48 (68%)	0.38
Systolic BP	130	75 (58%)	-19.87	7 (5%)	48 (37%)	17.29
Diastolic BP	130	81 (62%)	-12.10	9 (7%)	40 (31%)	8.80
Weight	121	64 (53%)	-4.19	16 (13%)	41 (34%)	5.11
BMI	120	46 (38%)	-2.04	27 (23%)	47 (39%)	2.13

Clinical paired results for females: Appendix 11

	No Pairs	Baseline†	1 yr follow up†	Mean difference	p-value	95% CI for diff
HbA1c	45	8.02 (1.89)	7.76 (1.46)	-0.25	0.37	-0.81 to 0.31
RBG	20	12.83 (4.82)	8.49 (3.61)	-4.34	<0.001	-5.99 to -2.69
Creatinine	45	82.76 (18.60)	79.80 (20.37)	-2.96	0.31	-8.73 to 2.81
Cholesterol	39	5.09 (1.08)	4.53 (0.98)	-0.56	0.001	-0.88 to -0.23
HDL	28	1.31 (0.40)	1.59 (0.80)	0.27	0.04	0.02 to 0.52
Systolic BP	51	141.92 (15.12)	139.02 (16.99)	-2.90	0.35	-9.13 to 3.33
Diastolic BP	51	76.71 (10.48)	71.98 (10.32)	-4.73	0.01	-8.37 to -1.07
Weight	49	77.33 (18.30)	76.24 (17.30)	-1.08	0.13	-2.48 to 0.31
BMI	48	30.77 (6.60)	30.40 (6.18)	-0.38	0.22	-0.99 to 0.24

† Figures are mean (st dev).

	Baseline	1 yr follow up	p-value †
Smoking Status			0.56
Current smoker	6 (13%)	5 (11%)	
Ex smoker	12 (26%)	13 (28%)	
Non smoker	29 (62%)	29 (62%)	
Physical Activity			0.22
Physically impossible	2 (11%)	2 (11%)	
Avoids even trivial	1 (5%)	2 (11%)	
Light	12 (63%)	9 (47%)	
Moderate	4 (21%)	6 (32%)	
Heavy	0 (0%)	0 (0%)	
Pulse Left			1.00
Present	37 (97%)	37 (97%)	
Absent	1 (3%)	1 (3%)	
Pulse Right			0.99
Present	36 (97%)	35 (95%)	
Absent	1 (3%)	2 (5%)	
Sense Left			1.00
Normal	35 (97%)	35 (97%)	
Impaired	1 (3%)	1 (3%)	
Sense Right			0.99
Normal	34 (100%)	33 (97%)	
Impaired	0 (0%)	1 (3%)	
Retina Left			---
Normal	18 (100%)	18 (100%)	
Mild Background	0 (0%)	0 (0%)	
Established	0 (0%)	0 (0%)	
Retina Right			---
Normal	18 (100%)	18 (100%)	
Mild Background	0 (0%)	0 (0%)	
Established	0 (0%)	0 (0%)	

† McNemars test used so only paired data is analysed.

Clinical paired results for males: Appendix 12

	No Pairs	Baseline†	1 yr follow up†	Mean difference	p-value	95% CI for diff
HbA1c	68	8.09 (1.96)	7.84 (1.55)	-0.25	0.32	-0.76 to 0.25
RBG	36	10.95 (3.21)	9.15 (2.83)	-1.80	0.01	-3.24 to -0.40
Creatinine	64	102.16 (51.26)	109.52 (89.80)	7.36	0.25	-5.18 to 19.89
Cholesterol	63	5.19 (1.06)	4.47 (0.91)	-0.69	<0.001	-1.01 to -0.37
HDL	43	1.13 (0.27)	1.32 (0.55)	0.19	0.02	0.04 to 0.35
Systolic BP	79	147.35 (18.61)	140.87 (19.25)	-6.48	0.01	-11.61 to -1.35
Diastolic BP	79	82.06 (10.03)	77.16 (10.99)	-4.90	<0.001	-7.39 to -2.41
Weight	72	90.00 (14.12)	89.93 (14.49)	-0.08	0.91	-1.36 to 1.21
BMI	72	29.57 (4.60)	29.90 (4.79)	0.33	0.20	-0.19 to 0.85

† Figures are mean (st dev).

	Baseline	1 yr follow up	p-value †
Smoking Status			0.005
Current smoker	15 (22%)	7 (10%)	
Ex smoker	25 (36%)	33 (48%)	
Non smoker	29 (42%)	29 (42%)	
Physical Activity			0.04
Physically impossible	0 (0%)	1 (3%)	
Avoids even trivial	11 (38%)	5 (17%)	
Light	13 (45%)	10 (35%)	
Moderate	5 (17%)	12 (41%)	
Heavy	0 (0%)	1 (3%)	
Pulse Left			0.81
Present	53 (100%)	50 (94%)	
Absent	0 (0%)	3 (6%)	
Pulse Right			0.25
Present	50 (100%)	45 (90%)	
Absent	0 (0%)	5 (10%)	
Sense Left			0.69
Normal	43 (84%)	45 (88%)	
Impaired	8 (16%)	6 (12%)	
Sense Right			0.22
Normal	38 (81%)	42 (89%)	
Impaired	9 (19%)	5 (11%)	
Retina Left			0.99
Normal	32 (97%)	31 (94%)	
Mild Background	0 (0%)	1 (3%)	
Established	1 (3%)	1 (3%)	
Retina Right			0.99
Normal	30 (97%)	29 (94%)	
Mild Background	0 (0%)	1 (3%)	
Established	1 (3%)	1 (3%)	

† McNemars test used so only paired data is analysed.

Clinical paired results for <55 yrs: Appendix 13

	No Pairs	Baseline†	1 yr follow up†	Mean difference	p-value	95% CI for diff
HbA1c	21	8.47 (2.64)	8.10 (1.76)	-0.37	0.55	-1.63 to 0.90
RBG	12	13.53 (3.52)	9.27 (2.89)	-4.27	0.006	-7.02 to -1.51
Creatinine	21	87.48 (56.55)	92.00 (80.70)	4.52	0.56	-11.34 to 20.39
Cholesterol	22	5.50 (1.06)	4.69 (0.87)	-0.81	0.01	-1.42 to -0.20
HDL	17	1.33 (0.55)	1.47 (0.68)	0.14	0.07	-0.01 to 0.30
Systolic BP	24	138.92 (14.26)	137.92 (16.35)	-1.00	0.74	-7.18 to 5.18
Diastolic BP	24	83.25 (11.26)	84.79 (11.14)	1.54	0.38	-2.03 to 5.11
Weight	22	92.51 (21.55)	91.80 (18.14)	-0.91	0.51	-3.71 to 1.89
BMI	22	32.18 (8.05)	32.14 (6.95)	-0.05	0.93	-1.14 to 1.04

† Figures are mean (st dev).

	Baseline	1 yr follow up	p-value †
Smoking Status			0.03
Current smoker	8 (29%)	3 (11%)	
Ex smoker	3 (11%)	8 (29%)	
Non smoker	17 (61%)	17 (61%)	
Physical Activity			0.09
Physically impossible	1 (10%)	1 (10%)	
Avoids even trivial	3 (30%)	2 (20%)	
Light	6 (60%)	2 (20%)	
Moderate	0 (0%)	4 (40%)	
Heavy	0 (0%)	1 (10%)	
Pulse Left			0.99
Present	23 (100%)	22 (96%)	
Absent	0 (0%)	1 (4%)	
Pulse Right			0.82
Present	21 (100%)	19 (91%)	
Absent	0 (0%)	2 (10%)	
Sense Left			---
Normal	21 (100%)	21 (100%)	
Impaired	0 (0%)	0 (0%)	
Sense Right			---
Normal	21 (100%)	21 (100%)	
Impaired	0 (0%)	0 (0%)	
Retina Left			---
Normal	16 (100%)	16 (100%)	
Mild Background	0 (0%)	0 (0%)	
Established	0 (0%)	0 (0%)	
Retina Right			---
Normal	15 (100%)	15 (100%)	
Mild Background	0 (0%)	0 (0%)	
Established	0 (0%)	0 (0%)	

† McNemars test used so only paired data is analysed.

Clinical paired results for 55-64 yrs: Appendix 14

	No Pairs	Baseline†	1 yr follow up†	Mean difference	p-value	95% CI for diff
HbA1c	18	7.83 (1.51)	7.66 (0.99)	-0.17	0.66	-0.99 to 0.65
RBG	9	10.33 (2.27)	8.77 (2.37)	-1.57	0.29	-4.72 to 1.58
Creatinine	18	111.33 (71.52)	121.50 (140.84)	10.17	0.56	-25.88 to 46.21
Cholesterol	18	5.01 (0.98)	4.66 (1.09)	-0.36	0.31	-1.08 to 0.37
HDL	10	1.10 (0.20)	1.25 (0.23)	0.16	0.01	0.05 to 0.26
Systolic BP	22	138.91 (14.32)	136.23 (13.56)	-2.68	0.54	-11.62 to 6.26
Diastolic BP	22	79.72 (8.48)	77.59 (8.21)	-2.14	0.42	-7.54 to 3.28
Weight	20	90.43 (15.95)	92.82 (16.08)	2.19	0.12	-0.61 to 4.96
BMI	20	30.50 (5.10)	31.60 (5.01)	1.10	0.02	0.19 to 2.01

† Figures are mean (st dev).

	Baseline	1 yr follow up	p-value †
Smoking Status			0.32
Current smoker	5 (25%)	4 (20%)	
Ex smoker	9 (45%)	10 (50%)	
Non smoker	6 (30%)	6 (30%)	
Physical Activity			0.26
Physically impossible	0 (0%)	0 (0%)	
Avoids even trivial	3 (27%)	1 (9%)	
Light	3 (27%)	2 (18%)	
Moderate	5 (46%)	8 (73%)	
Heavy	0 (0%)	0 (0%)	
Pulse Left			---
Present	17 (100%)	17 (100%)	
Absent	0 (0%)	0 (0%)	
Pulse Right			---
Present	17 (100%)	17 (100%)	
Absent	0 (0%)	0 (0%)	
Sense Left			1.00
Normal	16 (89%)	17 (94%)	
Impaired	2 (11%)	1 (6%)	
Sense Right			1.00
Normal	13 (87%)	14 (93%)	
Impaired	2 (13%)	1 (7%)	
Retina Left			0.99
Normal	9 (100%)	8 (89%)	
Mild Background	0 (0%)	1 (11%)	
Established	0 (0%)	0 (0%)	
Retina Right			0.99
Normal	9 (100%)	8 (89%)	
Mild Background	0 (0%)	1 (11%)	
Established	0 (0%)	0 (0%)	

† McNemars test used so only paired data is analysed.

Clinical paired results for 65-74 yrs: Appendix 15

	No Pairs	Baseline†	1 yr follow up†	Mean difference	p-value	95% CI for diff
HbA1c	50	8.25 (1.77)	7.98 (1.70)	-0.27	0.29	-0.77 to 0.24
RBG	22	10.97 (4.08)	8.87 (3.33)	-2.10	0.005	-3.49 to -0.70
Creatinine	45	87.80 (16.91)	86.38 (28.91)	-1.42	0.77	-11.34 to 8.50
Cholesterol	44	4.92 (0.89)	4.36 (0.92)	-0.56	<0.001	-0.82 to -0.31
HDL	32	1.19 (0.21)	1.52 (0.82)	0.34	0.02	0.05 to 0.62
Systolic BP	55	148.09 (18.13)	143.67 (19.84)	-4.41	0.19	-11.01 to 2.18
Diastolic BP	55	79.51 (10.56)	72.31 (11.06)	-7.20	<0.001	-10.48 to -3.92
Weight	52	82.61 (13.68)	81.67 (14.34)	-0.94	0.14	-2.21 to 0.33
BMI	52	29.46 (4.44)	29.25 (4.41)	-0.21	0.46	-0.78 to 0.35

† Figures are mean (st dev).

	Baseline	1 yr follow up	p-value †
Smoking Status			0.56
Current smoker	6 (13%)	5 (11%)	
Ex smoker	17 (38%)	18 (40%)	
Non smoker	22 (49%)	22 (49%)	
Physical Activity			0.22
Physically impossible	1 (6%)	1 (6%)	
Avoids even trivial	4 (22%)	3 (17%)	
Light	11 (61%)	10 (56%)	
Moderate	2 (11%)	4 (22%)	
Heavy	0 (0%)	0 (0%)	
Pulse Left			0.50
Present	33 (97%)	31 (91%)	
Absent	1 (3%)	3 (9%)	
Pulse Right			0.25
Present	32 (97%)	29 (88%)	
Absent	1 (3%)	4 (12%)	
Sense Left			0.63
Normal	28 (88%)	30 (94%)	
Impaired	4 (13%)	2 (6%)	
Sense Right			0.38
Normal	25 (83%)	28 (93%)	
Impaired	5 (17%)	2 (7%)	
Retina Left			1.00
Normal	17 (94%)	17 (94%)	
Mild Background	0 (0%)	0 (0%)	
Established	1 (6%)	1 (6%)	
Retina Right			1.00
Normal	17 (94%)	17 (94%)	
Mild Background	0 (0%)	0 (0%)	
Established	1 (6%)	1 (6%)	

† McNemars test used so only paired data is analysed.

Clinical paired results for >74 yrs: Appendix 16

	No Pairs	Baseline†	1 yr follow up†	Mean difference	p-value	95% CI for diff
HbA1c	24	7.48 (1.70)	7.31 (1.06)	-0.18	0.67	-1.00 to 0.65
RBG	13	11.84 (4.59)	8.75 (3.66)	-3.10	0.05	-6.22 to 0.02
Creatinine	25	98.80 (27.84)	103.76 (34.06)	4.96	0.32	-5.05 to 14.97
Cholesterol	18	5.34 (1.42)	4.4 (0.86)	-0.90	0.008	-1.54 to -0.26
HDL	12	1.17 (0.28)	1.26 (0.30)	0.09	0.11	-0.02 to 0.21
Systolic BP	29	149.79 (18.63)	138.28 (19.77)	-11.52	0.02	-21.30 to -1.73
Diastolic BP	29	78.28 (11.06)	70.62 (6.81)	-7.66	0.001	-11.99 to -3.32
Weight	27	78.87 (17.15)	77.63 (17.86)	-1.23	0.17	-3.02 to 0.55
BMI	26	29.08 (4.82)	28.92 (5.45)	-0.15	0.74	-1.08 to 0.77

† Figures are mean (st dev).

	Baseline	1 yr follow up	p-value †
Smoking Status			0.12
Current smoker	2 (9%)	0 (0%)	
Ex smoker	8 (35%)	10 (44%)	
Non smoker	13 (57%)	13 (57%)	
Physical Activity			0.25
Physically impossible	0 (0%)	1 (11%)	
Avoids even trivial	2 (22%)	1 (11%)	
Light	5 (56%)	5 (56%)	
Moderate	2 (22%)	2 (22%)	
Heavy	0 (0%)	0 (0%)	
Pulse Left			---
Present	17 (100%)	17 (100%)	
Absent	0 (0%)	0 (0%)	
Pulse Right			0.99
Present	16 (100%)	15 (94%)	
Absent	0 (0%)	1 (6%)	
Sense Left			0.99
Normal	13 (81%)	12 (75%)	
Impaired	3 (19%)	4 (25%)	
Sense Right			1.00
Normal	13 (87%)	12 (80%)	
Impaired	2 (13%)	3 (20%)	
Retina Left			---
Normal	8 (100%)	8 (100%)	
Mild Background	0 (0%)	0 (0%)	
Established	0 (0%)	0 (0%)	
Retina Right			---
Normal	8 (100%)	8 (100%)	
Mild Background	0 (0%)	0 (0%)	
Established	0 (0%)	0 (0%)	

† McNemars test used so only paired data is analysed.

Clinical paired results for deocats 1&2: Appendix 17

	No Pairs	Baseline†	1 yr follow up†	Mean difference	p-value	95% CI for diff
HbA1c	23	7.39 (1.47)	7.22 (1.10)	-0.17	0.61	-0.84 to 0.51
RBG	13	11.48 (3.73)	7.19 (3.39)	-4.27	0.003	-6.82 to -1.71
Creatinine	20	97.95 (18.63)	91.20 (26.58)	-6.75	0.08	-14.27 to 0.77
Cholesterol	19	5.41 (1.35)	4.13 (0.82)	-1.26	0.001	-1.99 to -0.57
HDL	16	1.26 (0.30)	1.41 (0.28)	0.18	0.003	0.07 to 0.26
Systolic BP	29	148.21 (16.92)	138.07 (20.42)	-10.13	0.04	-19.57 to -0.71
Diastolic BP	29	79.24 (11.18)	72.24 (11.15)	-7.00	<0.001	-10.50 to -3.50
Weight	25	78.52 (15.39)	77.74 (14.06)	-0.78	0.42	-2.73 to 1.17
BMI	24	27.33 (3.87)	27.63 (3.55)	-0.21	0.61	-1.03 to 0.62

† Figures are mean (st dev).

	Baseline	1 yr follow up	p-value †
Smoking Status			---
Current smoker	3 (14%)	3 (14%)	
Ex smoker	8 (36%)	8 (36%)	
Non smoker	11 (50%)	11 (50%)	
Physical Activity			0.12
Physically impossible	1 (9%)	2 (18%)	
Avoids even trivial	2 (18%)	0 (0%)	
Light	7 (64%)	5 (46%)	
Moderate	1 (9%)	4 (36%)	
Heavy	0 (0%)	0 (0%)	
Pulse Left			---
Present	18 (100%)	18 (100%)	
Absent	0 (0%)	0 (0%)	
Pulse Right			---
Present	17 (100%)	17 (100%)	
Absent	0 (0%)	0 (0%)	
Sense Left			1.00
Normal	15 (94%)	14 (88%)	
Impaired	1 (6%)	2 (13%)	
Sense Right			---
Normal	14 (93%)	14 (93%)	
Impaired	1 (7%)	1 (7%)	
Retina Left			---
Normal	10 (100%)	10 (100%)	
Mild Background	0 (0%)	0 (0%)	
Established	0 (0%)	0 (0%)	
Retina Right			---
Normal	9 (100%)	9 (100%)	
Mild Background	0 (0%)	0 (0%)	
Established	0 (0%)	0 (0%)	

† McNemars test used so only paired data is analysed.

Clinical paired results for depts 3, 4 & 5: Appendix 18

	No Pairs	Baseline†	1 yr follow up†	Mean difference	p-value	95% CI for diff
HbA1c	57	8.03 (1.98)	8.09 (1.58)	0.05	0.83	-0.46 to 0.57
RBG	27	10.91 (3.37)	8.79 (2.68)	-2.12	0.01	-3.73 to -0.51
Creatinine	57	97.00 (53.27)	102.38 (93.71)	5.39	0.41	-7.60 to 18.37
Cholesterol	54	5.06 (1.02)	4.76 (0.98)	-0.30	0.03	-0.57 to -0.04
HDL	39	1.23 (0.37)	1.53 (0.82)	0.29	0.02	0.06 to 0.52
Systolic BP	65	143.77 (17.51)	140.28 (16.33)	-3.49	0.20	-8.83 to 1.85
Diastolic BP	65	80.53 (10.12)	75.84 (11.57)	-4.69	0.003	-7.71 to -1.67
Weight	62	84.95 (16.65)	85.46 (17.15)	0.51	0.42	-0.74 to 1.78
BMI	62	29.60 (4.79)	29.95 (4.93)	0.35	0.18	-0.02 to 0.87

† Figures are mean (st dev).

	Baseline	1 yr follow up	p-value †
Smoking Status			0.06
Current smoker	13 (22%)	8 (14%)	
Ex smoker	14 (24%)	19 (33%)	
Non smoker	31 (53%)	31 (53%)	
Physical Activity			0.12
Physically impossible	0 (0%)	0 (0%)	
Avoids even trivial	8 (29%)	7 (25%)	
Light	12 (43%)	9 (32%)	
Moderate	8 (29%)	12 (43%)	
Heavy	0 (0%)	0 (0%)	
Pulse Left			0.84
Present	48 (100%)	46 (96%)	
Absent	0 (0%)	2 (4%)	
Pulse Right			0.59
Present	49 (100%)	46 (94%)	
Absent	0 (0%)	3 (6%)	
Sense Left			0.22
Normal	39 (85%)	43 (94%)	
Impaired	7 (15%)	3 (7%)	
Sense Right			0.38
Normal	37 (86%)	40 (93%)	
Impaired	6 (14%)	3 (7%)	
Retina Left			0.99
Normal	28 (100%)	27 (96%)	
Mild Background	0 (0%)	1 (4%)	
Established	0 (0%)	0 (0%)	
Retina Right			0.99
Normal	27 (100%)	26 (96%)	
Mild Background	0 (0%)	1 (4%)	
Established	0 (0%)	0 (0%)	

† McNemars test used so only paired data is analysed.

Clinical paired results for deprecats 6 & 7: Appendix 19

	No Pairs	Baseline†	1 yr follow up†	Mean difference	p-value	95% CI for diff
HbA1c	33	8.58 (2.00)	7.74 (1.58)	-0.84	0.04	-1.65 to -0.03
RBG	16	12.96 (4.78)	10.52 (3.88)	-2.43	0.03	-4.52 to -0.33
Creatinine	32	86.69 (27.03)	91.88 (36.49)	5.19	0.40	-7.14 to 17.52
Cholesterol	29	5.10 (0.95)	4.26 (0.76)	-0.84	<0.001	-1.26 to -0.43
HDL	16	1.08 (0.25)	1.19 (0.41)	0.11	0.11	-0.02 to 0.25
Systolic BP	36	145.44 (17.89)	141.58 (20.35)	-3.86	0.31	-11.52 to 3.80
Diastolic BP	36	79.50 (10.87)	76.17 (9.56)	-3.33	0.13	-7.74 to 1.07
Weight	34	89.40 (17.92)	87.30 (17.89)	-2.10	0.04	-4.10 to -0.10
BMI	34	32.44 (6.79)	32.12 (6.46)	-0.32	0.47	-1.21 to 0.57

† Figures are mean (st dev).

	Baseline	1 yr follow up	p-value †
Smoking Status			0.046
Current smoker	5 (14%)	1 (3%)	
Ex smoker	15 (42%)	19 (53%)	
Non smoker	16 (44%)	16 (44%)	
Physical Activity			0.07
Physically impossible	1 (11%)	1 (11%)	
Avoids even trivial	2 (22%)	0 (0%)	
Light	6 (67%)	5 (56%)	
Moderate	0 (0%)	2 (22%)	
Heavy	0 (0%)	1 (11%)	
Pulse Left			0.99
Present	24 (96%)	23 (92%)	
Absent	1 (4%)	2 (8%)	
Pulse Right			0.25
Present	20 (95%)	17 (81%)	
Absent	1 (5%)	4 (19%)	
Sense Left			0.99
Normal	24 (96%)	23 (92%)	
Impaired	1 (4%)	2 (8%)	
Sense Right			---
Normal	21 (91%)	21 (91%)	
Impaired	2 (9%)	2 (9%)	
Retina Left			---
Normal	12 (92%)	12 (92%)	
Mild Background	0 (0%)	0 (0%)	
Established	1 (8%)	1 (8%)	
Retina Right			---
Normal	12 (92%)	12 (92%)	
Mild Background	0 (0%)	0 (0%)	
Established	1 (8%)	1 (8%)	

† McNemars test used so only paired data is analysed.

Importance of ongoing education and advice: Appendix 20

	1 (not important)	2	3	4	5 (very important)	p-value
Diet	0 (0%)	0 (0%)	1 (3%)	8 (21%)	31 (82%)	<0.001
Oral Hypoglycaemic Agents	0 (0%)	0 (0%)	2 (5%)	12 (32%)	24 (63%)	<0.001
Insulin Administration	0 (0%)	0 (0%)	3 (8%)	8 (21%)	27 (71%)	<0.001
Insulin Dose Adjustment	0 (0%)	0 (0%)	3 (8%)	8 (21%)	27 (71%)	<0.001
Hypoglycaemia	0 (0%)	1 (3%)	2 (5%)	8 (21%)	26 (70%)	<0.001
Hyperglycaemia	0 (0%)	1 (3%)	4 (11%)	6 (17%)	25 (69%)	<0.001
Blood Glucose Monitoring	0 (0%)	2 (5%)	7 (18%)	10 (26%)	19 (50%)	<0.001
Urinary Glucose Monitoring	5 (14%)	10 (27%)	9 (24%)	7 (19%)	6 (16%)	0.67
What to do when sick	0 (0%)	1 (3%)	1 (3%)	11 (29%)	25 (66%)	<0.001
Social Eating	0 (0%)	1 (3%)	9 (24%)	17 (45%)	11 (29%)	<0.001
Alcohol	0 (0%)	0 (0%)	5 (13%)	20 (53%)	13 (34%)	<0.001
Exercise	0 (0%)	0 (0%)	2 (5%)	11 (29%)	25 (66%)	<0.001
Foot care	0 (0%)	0 (0%)	2 (5%)	3 (8%)	33 (87%)	<0.001
Smoking	0 (0%)	0 (0%)	0 (0%)	5 (13%)	33 (87%)	<0.001
Psychological Aspects	0 (0%)	1 (3%)	7 (18%)	11 (29%)	19 (50%)	<0.001
Employment	0 (0%)	2 (5%)	8 (21%)	16 (42%)	12 (32%)	<0.001
Sexual Function	0 (0%)	0 (0%)	8 (22%)	15 (41%)	14 (38%)	<0.001
Contraception/ Pregnancy	0 (0%)	0 (0%)	7 (19%)	10 (27%)	20 (54%)	<0.001
Driving & the DVLA	0 (0%)	0 (0%)	9 (24%)	12 (32%)	16 (43%)	<0.001

Importance of the annual undertaking of parameters: Appendix 21

	1 (not important)	2	3	4	5 (very important)	p-value
Weight	0 (0%)	0 (0%)	6 (16%)	13 (35%)	18 (49%)	<0.001
BMI	0 (0%)	0 (0%)	4 (11%)	10 (27%)	23 (61%)	<0.001
Height	34 (90%)	0 (0%)	2 (5%)	0 (0%)	1 (3%)	<0.001
Dietary Assessment	0 (0%)	0 (0%)	5 (14%)	12 (32%)	20 (54%)	<0.001
Blood Pressure	0 (0%)	0 (0%)	1 (3%)	7 (19%)	29 (78%)	<0.001
Blood Samples Taken	0 (0%)	0 (0%)	0 (0%)	6 (16%)	31 (84%)	<0.001
Testing Urine for Glucose	6 (17%)	4 (11%)	9 (25%)	7 (19%)	10 (28%)	0.53
Testing Urine for Ketones	2 (6%)	7 (19%)	8 (22%)	4 (11%)	15 (42%)	0.008
Testing Urine for Protein	1 (3%)	0 (0%)	3 (8%)	7 (19%)	25 (69%)	<0.001
Testing Visual Acuity	1 (3%)	1 (3%)	0 (0%)	8 (22%)	27 (73%)	<0.001
Retinal Screening	0 (0%)	0 (0%)	1 (3%)	5 (14%)	31 (84%)	<0.001
Testing for Neuropathy	0 (0%)	0 (0%)	3 (8%)	6 (16%)	28 (76%)	<0.001
Inspection of Feet/ Footwear	0 (0%)	1 (3%)	3 (8%)	5 (14%)	26 (76%)	<0.001
Inspection of Injection Sites	0 (0%)	2 (5%)	5 (14%)	7 (19%)	23 (62%)	<0.001
Impotence/ Sexual Function	0 (0%)	2 (5%)	6 (16%)	13 (35%)	16 (43%)	<0.001

Importance of management issues: Appendix 22

	Profession								p-value‡
	All	p-value†	PM's	GP's	PN's	Pod's	Dietn's	DN's	
Optimise HbA1c Levels		<0.001							0.40
1 (not important)	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
4	8 (22%)		0 (0%)	4 (33%)	2 (17%)	0 (0%)	0 (0%)	2 (50%)	
5 (very important)	28 (78%)		2 (100%)	8 (67%)	10 (83%)	5 (100%)	1 (100%)	2 (50%)	
Optimise Blood pressure		<0.001							0.30
1 (not important)	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
4	5 (14%)		0 (0%)	2 (15%)	1 (8%)	0 (0%)	0 (0%)	2 (50%)	
5 (very important)	32 (86%)		2 (100%)	11 (85%)	11 (92%)	5 (100%)	1 (100%)	2 (50%)	
Treat Abnormal Lipid Profile		<0.001							0.27
1 (not important)	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	1 (3%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (25%)	
4	8 (22%)		0 (0%)	3 (23%)	2 (17%)	1 (20%)	0 (0%)	2 (50%)	
5 (very important)	28 (76%)		2 (100%)	10 (77%)	10 (83%)	4 (80%)	1 (100%)	1 (25%)	
Return Appointment		<0.001							0.26
1 (not important)	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	4 (11%)		0 (0%)	3 (23%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	
4	9 (24%)		0 (0%)	3 (23%)	1 (8%)	3 (60%)	1 (100%)	1 (25%)	
5 (very important)	24 (65%)		2 (100%)	7 (54%)	10 (83%)	2 (40%)	0 (0%)	3 (75%)	
Discuss Individual Targets		<0.001							0.63
1 (not important)	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	1 (3%)		0 (0%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	4 (11%)		0 (0%)	2 (15%)	1 (8%)	0 (0%)	0 (0%)	1 (25%)	
4	14 (38%)		0 (0%)	6 (46%)	2 (17%)	3 (60%)	1 (100%)	2 (50%)	
5 (very important)	18 (49%)		2 (100%)	4 (31%)	9 (75%)	2 (40%)	0 (0%)	1 (25%)	
Sources of Help		<0.001							0.64
1 (not important)	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	1 (3%)		0 (0%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	4 (11%)		0 (0%)	3 (23%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	
4	20 (54%)		1 (50%)	8 (62%)	4 (33%)	3 (60%)	1 (100%)	3 (75%)	
5 (very important)	12 (32%)		1 (50%)	1 (8%)	7 (58%)	2 (40%)	0 (0%)	1 (25%)	
Diabetes UK		<0.001							0.98
1 (not important)	1 (3%)		0 (0%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	1 (3%)		0 (0%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	7 (19%)		0 (0%)	2 (15%)	3 (25%)	1 (20%)	0 (0%)	1 (25%)	
4	19 (51%)		1 (50%)	8 (62%)	5 (42%)	2 (40%)	1 (100%)	2 (50%)	
5 (very important)	9 (24%)		1 (50%)	1 (8%)	4 (33%)	2 (40%)	0 (0%)	1 (25%)	

† Chi-squared test for equal proportions used on proportions of each rating answer

‡ Chi-squared test for equal proportions used on distributions of proportions for each profession.

Importance of referrals to other HCP's: Appendix 23

	Profession								p-value‡
	All	p-value†	PM's	GP's	PN's	Pod's	Dietn's	DN's	
Dietitian		<0.001							0.87
1 (not important)	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	1 (3%)		0 (0%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	4 (11%)		0 (0%)	2 (15%)	1 (8%)	0 (0%)	0 (0%)	1 (25%)	
4	7 (19%)		1 (100%)	2 (15%)	3 (25%)	1 (20%)	0 (0%)	0 (0%)	
5 (very important)	25 (68%)		0 (0%)	8 (62%)	8 (67%)	4 (80%)	1 (100%)	3 (75%)	
Specialist Diabetic Team		<0.001							0.76
1 (not important)	2 (5%)		0 (0%)	1 (8%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	
2	2 (5%)		0 (0%)	2 (15%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	7 (19%)		0 (0%)	3 (23%)	4 (33%)	0 (0%)	0 (0%)	0 (0%)	
4	8 (22%)		1 (100%)	3 (23%)	1 (8%)	2 (40%)	0 (0%)	1 (25%)	
5 (very important)	18 (49%)		0 (0%)	4 (31%)	6 (50%)	3 (60%)	1 (100%)	3 (75%)	
Retinal Screening Test		<0.001							0.82
1 (not important)	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	1 (3%)		0 (0%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
4	8 (22%)		1 (100%)	3 (23%)	2 (17%)	1 (20%)	0 (0%)	1 (25%)	
5 (very important)	28 (76%)		0 (0%)	9 (69%)	10 (83%)	4 (80%)	1 (100%)	3 (75%)	
Exercise Referral		<0.001							0.76
1 (not important)	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	1 (3%)		0 (0%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	6 (16%)		0 (0%)	4 (31%)	1 (8%)	0 (0%)	0 (0%)	1 (25%)	
4	18 (49%)		1 (100%)	5 (39%)	7 (58%)	4 (80%)	0 (0%)	1 (25%)	
5 (very important)	12 (32%)		0 (0%)	3 (23%)	4 (33%)	1 (20%)	1 (100%)	2 (50%)	
Nephrologist		0.001							0.12
1 (not important)	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	3 (8%)		0 (0%)	3 (23%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	12 (33%)		0 (0%)	6 (46%)	4 (36%)	1 (20%)	0 (0%)	1 (25%)	
4	7 (19%)		1 (100%)	2 (15%)	1 (9%)	3 (60%)	0 (0%)	0 (0%)	
5 (very important)	14 (39%)		0 (0%)	2 (15%)	6 (55%)	1 (20%)	1 (100%)	3 (75%)	
Other		<0.001							0.96
1 (not important)	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
4	2 (22%)		0 (0%)	0 (0%)	0 (0%)	2 (100%)	0 (0%)	0 (0%)	
5 (very important)	7 (78%)		0 (0%)	1 (100%)	3 (100%)	0 (0%)	1 (100%)	1 (100%)	

† Chi-squared test for equal proportions used on proportions of each rating answer.

‡ Chi-squared test for equal proportions used on distributions of proportions for each profession.

NB other is made up of Podiatrist (67%), Vascular Clinic (11%), Chiropody (11%), Psychologist (11%).

Importance of recording findings and results: Appendix 24

	Profession								p-value‡
	All	p-value†	PM's	GP's	PN's	Pod's	Dietn's	DN's	
Medical Notes		<0.001							0.58
1 (not important)	1 (3%)		0 (0%)	0 (0%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	
2	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	1 (3%)		0 (0%)	0 (0%)	0 (0%)	1 (20%)	0 (0%)	0 (0%)	
4	5 (14%)		1 (50%)	2 (15%)	0 (0%)	1 (20%)	0 (0%)	1 (25%)	
5 (very important)	30 (81%)		1 (50%)	11 (85%)	11 (92%)	3 (60%)	1 (100%)	3 (75%)	
Practice Diabetes Register		<0.001							0.07
1 (not important)	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	5 (14%)		1 (50%)	2 (15%)	0 (0%)	1 (20%)	1 (100%)	0 (0%)	
4	6 (16%)		0 (0%)	4 (31%)	0 (0%)	1 (20%)	0 (0%)	1 (25%)	
5 (very important)	26 (70%)		1 (50%)	7 (54%)	12 (100%)	3 (60%)	0 (0%)	3 (75%)	
Patient Held Records		0.008							0.86
1 (not important)	1 (3%)		0 (0%)	0 (0%)	1 (9%)	0 (0%)	0 (0%)	0 (0%)	
2	4 (11%)		0 (0%)	3 (23%)	0 (0%)	1 (20%)	0 (0%)	0 (0%)	
3	14 (39%)		0 (0%)	6 (46%)	5 (46%)	1 (20%)	1 (100%)	1 (25%)	
4	8 (22%)		1 (50%)	2 (15%)	2 (18%)	2 (40%)	0 (0%)	1 (25%)	
5 (very important)	9 (25%)		1 (50%)	2 (15%)	3 (27%)	1 (20%)	0 (0%)	2 (50%)	
Other		---							---
1 (not important)	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
2	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3	0 (0%)		0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
4	1 (17%)		0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	
5 (very important)	5 (83%)		0 (0%)	1 (100%)	3 (100%)	0 (0%)	0 (0%)	1 (100%)	

† Chi-squared test for equal proportions used on proportions of each rating answer.

‡ Chi-squared test for equal proportions used on distributions of proportions for each profession.

NB other is made up of IT database (17%), CDSS (34%), Unspecified (49%).