East Coast Area diabetes shared care programme (ECAD) audit 2006

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

East Coast Area Diabetes Shared Care Programme (ECAD)

Audit 2006

HEALTH SERVICE EXECUTIVE
DUBLIN MID-LEINSTER

2008

Acknowledgements

Credit for collating, analysing and reporting on the audit data goes to Dr Mohammed Bashir, St. Vincent's University Hospital, Dublin. His work provides a great source of valuable information reflecting Diabetes management in Ireland today. It will serve as a worthwhile comparison with other audits conducted throughout Ireland and indeed future audits of the East Coast Area Diabetes Shared Care Programme. The work of those who collected the data in each practice is also appreciated, namely the Doctors and Practice Nurses. The audit could not have been conducted without their contributions.

Contents

1.0 INTRODUCTION

Diabetes Mellitus (DM) is a metabolic disorder of multiple aetiology characterised by chronic hyperglycaemia resulting from defects in insulin secretion, insulin action or both[1]. Diabetes is classified as Type 1 and Type 2 mainly. Type 2 is more common, existing in approximately 85% of diabetes cases[2]. It is associated with a combination of insulin deficiency and insulin resistance, generally presents after 40 years of age and the incidence increases with age[3]. Over the last decade more and more patients in their second and third decades of life have been diagnosed with Type 2 DM. Some 50% of cases are undiagnosed with a delay of up to 10 years between the onset of the disease and its diagnosis. Microvascular and macrovascular diseases are associated with diabetes, resulting in an increased relative risk of myocardial infarction, cerebrovascular accident, chronic kidney disease, limb amputation and blindness[4]. There is evidence that maintenance of good glycaemic control can prevent, postpone or limit complications in both Type 1 and Type 2 DM[5,6]. Recently, the Epidemiology of Diabetes Interventions and Complications Study (EDIC)[7], which followed up the cohort of patients in the DCCT trial[6], has shown that early intensive treatment in patients with Type 1 DM has sustained long term outcomes in terms of decreased development and progression of both micro and macrovascular complications. There was a decrease in cardiovascular death by 52% in the intensive group. Similarly in Type 2 DM; STENO 2 trial has reported on long term multi-interventional follow up[8]. This land mark trial originally looked at two matched groups with Type 2 DM and microalbuminuria. One group received standard care and the second group received an intensive multifactorial intervention targeting glycaemic control, blood pressure control and lipid control. The original study showed 50% reduction in cardiovascular and microvascular events. The long term follow up (average 13.3years) in which the intensive group returned to standard care has shown that benefits are sustained. Most importantly there was an added benefit of decreased cardiovascular mortality for the intensive group.

1.1 Incidence of Diabetes

Recent estimates indicate that there were 171 million people with Diabetes worldwide in the year 2000 and this is projected to increase to 366 million by 2030[9]. In Ireland the incidence is estimated to be 5% of the population. A report by the Institute of Public Health in Ireland (IPH) from July 2007 predicts a 26% increase in diabetes in Northern Ireland and a 37% increase in the Republic over the ten year period 2005 to 2015[10]. This increase is associated with both demographic and lifestyle changes including a more sedentary lifestyle, dietary factors, obesity and an ageing population. Within the former Eastern Regional Health Authority (ERHA), 30,000 people are diagnosed with diabetes, but it is estimated that due to under-detection of the condition, there may in fact be a total of 75,000 people with diabetes in the region[11]. In the former East Coast Area Health Board (ECAHB), 32% (n=101,367) of the population are over 45 years and 12% (n=36,484) of these are over 65 years[11]. Given the increased incidence of diabetes in the elderly, this has implications for the management of diabetes within this area.

1.2 Cost Implications

The American Diabetes Association (ADA) estimated the national cost of diabetes in the USA for 2007 to be $174 billion compared to $132 billion in 2002 i.e. $42 billion increase over 5 years[12]. In the region of 15% of the budget is spent on diabetes microvascular complications and 10% on cardiovascular complications. In Ireland some €350m (i.e. 10% of the total health budget) is spent on diabetes healthcare per annum, with 59% of these costs associated with the treatment of complications of diabetes[4]. It is estimated that the cost for a patient with both macro and microvascular complications is €4,934 p.a. compared with €1,985 p.a. for a patient with no complications. The indirect cost of diabetes on society combined with the cost to individuals is even greater.

2.0 ESTABLISHMENT OF A SHARED CARE PROGRAMME FOR DIABETES

Diabetes shared care is defined as:

"The joint participation of hospital and primary care teams in the planned delivery of care to people with diabetes and their carers, informed by an enhanced information exchange, over and above routine discharge and referral notes".[13]

In 2001 the East Coast Area Diabetes Shared Care Programme (ECAD) was established and involved 14 General Practitioners (GPs) working in 11 practices and three hospitals: St.Vincent's University Hospital (SVUH), St.Columcille's Hospital (SCH) and St. Michael's Hospital (SMH) (See Appendix for ECAD members). Patients with Type 2 DM who are not on insulin and are attending one of the participating practices are eligible for enrollment in the programme.

Communication between primary care and the 3 hospitals identified above is facilitated by the Community Dietitian and Community Diabetes Nurse Specialist (DNS). Information on each patient is communicated by a computerised database between primary and hospital-based care. It includes information relating to patients' medical/surgical history, medication and bio-chemical parameters.

2.1 The Importance of Shared Care

It is now very clear from the available evidence especially from the STENO 2 trial[8] that early intensive intervention targeting multiple risk factors in patients with Type 2 DM should be the standard of care. The historic system of referring patients for specialist care when diabetes related complications occur is financially flawed and fails to provide adequate care to the person with diabetes. The increasing numbers of patients with Type 2 DM is outweighing the expansion of health care facilities at both secondary and tertiary levels. Delivering a standard service to all these patients as early and efficiently as possible will not be achievable without the involvement and co-ordination of all patients' carers.

There is good evidence that patients who attend integrated care have similar metabolic outcomes, improved psychological outcomes, more involvement with the care delivered and less cost compared to patients who attend secondary care only[14, 15]. A systematic review published in 1994 by the Royal college of General Practitioners (RCGP) has demonstrated that structured care by GPs with an interest in diabetes and supported by an enthusiastic specialist liaison team produces comparable, and occasionally superior, levels of care to those provided in hospital[16]. Unstructured care by disinterested and unsupported GPs is ineffective and wasteful of resources. It was also found that regular audit is important in maintaining standards of care. A randomised controlled trial from the North Dublin integrated shared care scheme has shown significant improvements in diabetes care delivery and in psychosocial outcomes for patients, with improved information exchange across the primary–secondary care interface[14]. A further study from Aberdeen has shown that integrated care for diabetes was at least as effective as conventional hospital clinic care with lower cost and greater patient satisfaction[15].

3.0 ECAD AUDIT 2006

3.1 Background

An audit of ECAD was conducted in 2004 to assess the process and outcome of care. Data from 2004 was collected in the Primary Health Care (PHC) setting on 249 patients. In general the findings were encouraging especially in terms of outcome measures. Of note, knowledge of the annual review visit within secondary care was poor with just 56% (n=139) of patients having a record on file within PHC (Table 1). In addition, documentation of retinal screening and micro-albuminuria screening was present in just 35% (n=87) and 18% (n=46) of patients respectively (Table 1). Calculation of Body Mass Index (BMI) was infrequently carried out on individual patients in shared care (i.e. 41%: n=101), and there was poor documentation of foot examination (i.e. 37%: n=91) (Table 1). The outcome results were compared with 43 patients attending SVUH only and overall these results were positive, comparing reasonably well with international targets. This is illustrated in Table 2 below.

In the summer of 2007 another audit of ECAD was undertaken, based on activity within the shared care programme between January to December 2006.

Table 1: ECAD Audit 2004: Process of Care Findings (n=249)

Process of Care	% (n)
Record of Annual Review in PHC	56 (139)
Record of Retinal Screening	35 (87)
Record of Micro-albuminuria Screening	18 (46)
Record of Foot Examination	37 (91)
Calculation of BMI	41 (101)

Table 2: ECAD Audit 2004: Outcomes of Care Findings and Comparison with Hospital Only Group

Parameter	**Target** (International Diabetes Federation[17])	**ECAD 2004** (n=249)	**HOSPITAL 2003** (n=43)
HbA1c	<6.5%	6.8%	7.2%
Systolic BP	130mm Hg	139mm Hg	135mm Hg
Diastolic BP	80mm Hg	77mm Hg	76mm Hg
Total Cholesterol	<5.0mmol/l	4.6mmol/l	4.7mmol/l
Triglycerides	<2.3mmol/l	-	-
LDL Cholesterol	<2.5mmol/l	2.7mmol/l	-
HDL Cholesterol	>1.0mmol/l	-	-

3.2 Aim of Audit

"Clinical audit is a clinically-led initiative in which healthcare professionals compare actual practice against agreed, documented evidence-based standards with the intention of modifying their practice where indicated, thereby improving patient care." [18]

The aims of the audit in 2007 were:

1. To assess the process of care in ECAD during 2006
2. To assess the outcome of care in ECAD during 2006
3. To compare the process and outcome of care with the findings of the ECAD audit, 2004
4. To compare outcomes of care with a similar group attending hospital only
5. To compare the outcome of care with international targets
6. To present all of the above in a report for reference purposes

3.3 Methodology

Data relating to 2006 was collected between June and July of 2007. Data was entered onto an Excel spread sheet from the 11 GP practices. Collection of data was conducted by either the GPs themselves, the practice nurse, DNS or Dietitian. Data was analysed using the Statistical Package for Social Sciences (SPSS) software.

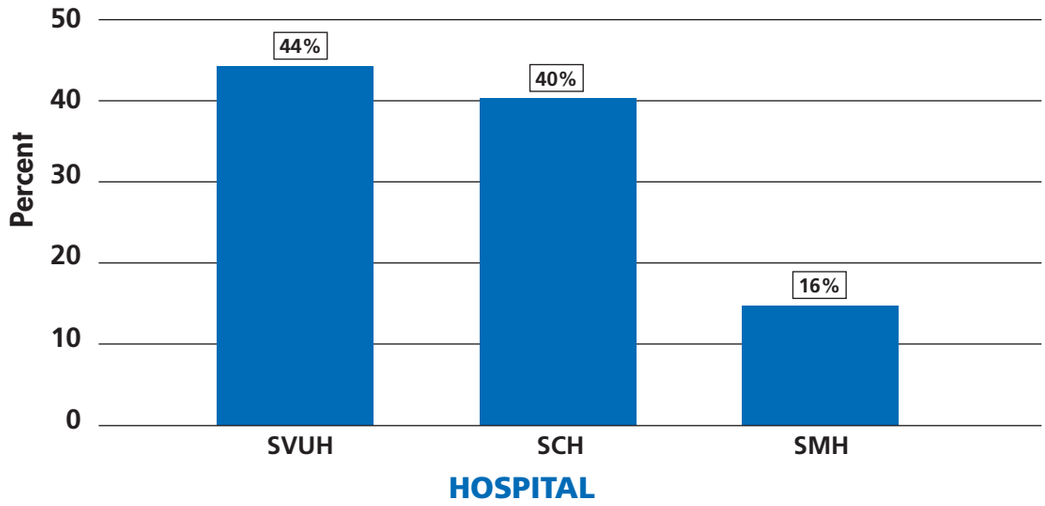
3.4 Results of Audit

Four hundred patients in total are currently registered with the ECAD programme. Data was collected from patients enrolled in ECAD preceding January 1st 2006 (261 patients). Baseline characteristics of patients included in the audit are shown in Table 3 where 57% (n=149) were male and 43% (n=112) were female, the average age was 65 years and the average duration of diabetes was 6.6 years. Review of patient status indicated that 89% (n=232) of patients were actively involved in the programme, 8% (n=21) were inactive and 3% (n=8) had died. SVUH had 44% (n=115) of patients attending, SCH 40% (n=105) and SMH had 16% (n=41) attending (Figure 1).

Table 3: Baseline characteristics of patients

Sex	Male 57% (n=149) Female 43% (n=112)
Age	65 years (27 - 91 years)
Duration of Diabetes	6.6 years (0.5 – 34 years)
Status	89% Active (n=232) 8% Inactive (n=21) 3% Died (n=8)

Figure 1: Hospitals attended by patients



Two or more appointments to PHC were offered to 90% (n=235) of patients and 8% (n=21) were offered one appointment (Figure 2). Two per cent (n=5) received no appointment within PHC (Figure 2).

Figure 2: Number of reviews offered in Primary Healthcare

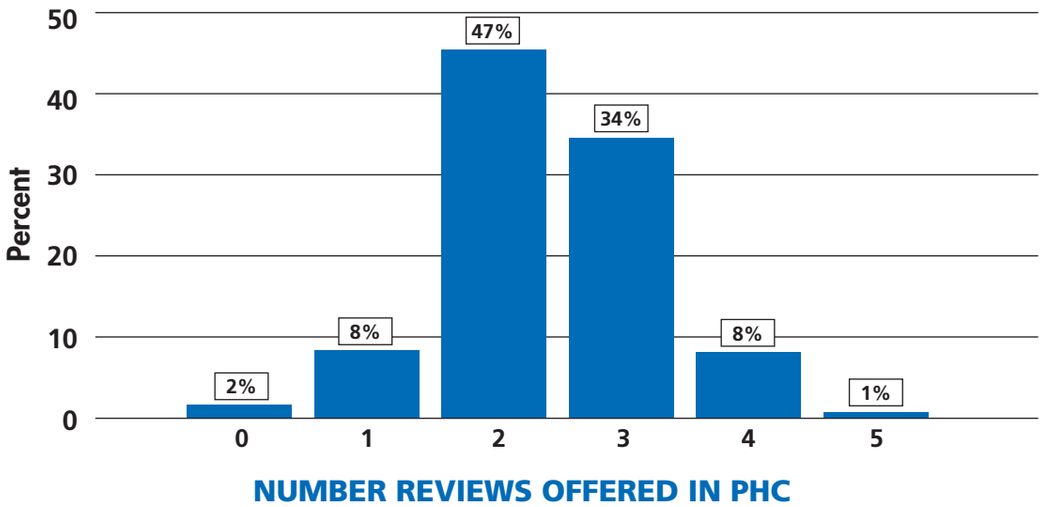


Figure 3: Number of reviews attended in Primary Healthcare

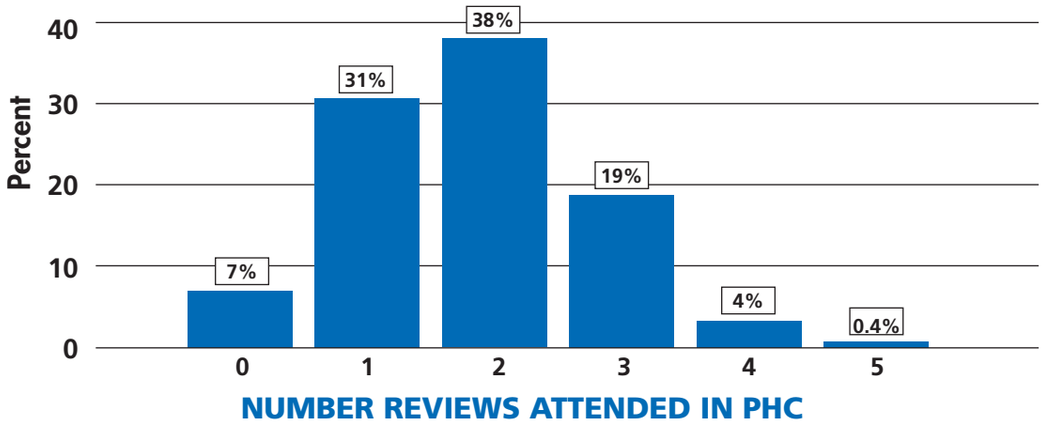


Figure 3 shows that 93% (n=242) of patients attended one or more appointments in PHC. One or more visits to the hospital were made by 63% (n=165) of patients while 37% (n=96) did not have any visits (Figure 4). Only 56% (n=147) of patients were known to have had an annual review in 2006 (Figure 5). A report of this annual review was available within PHC in 52% (n=146) of cases (Figure 6).

Figure 4: Number of visits to hospital clinics

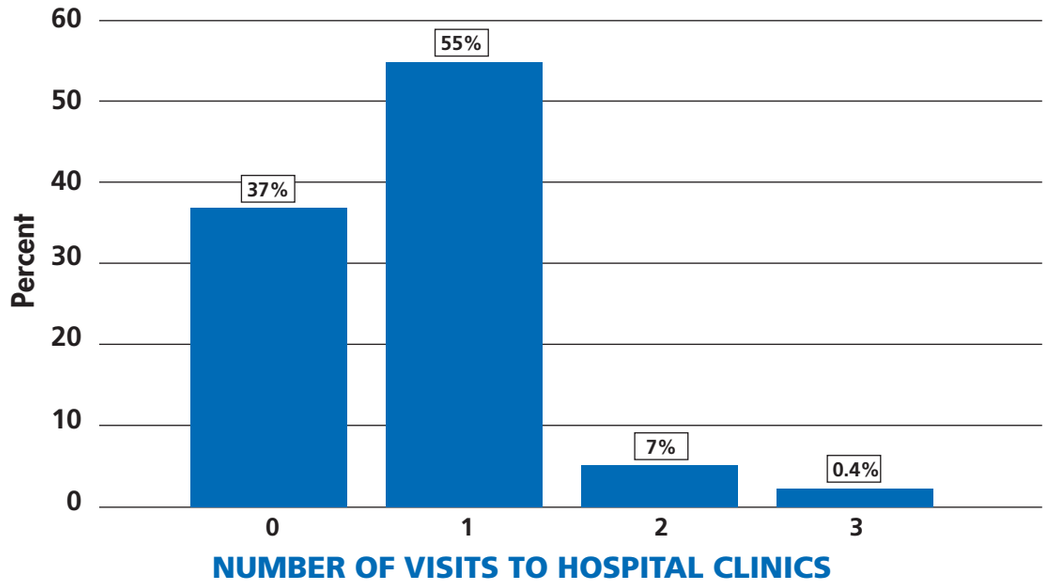


Figure 5: Annual reviews attended

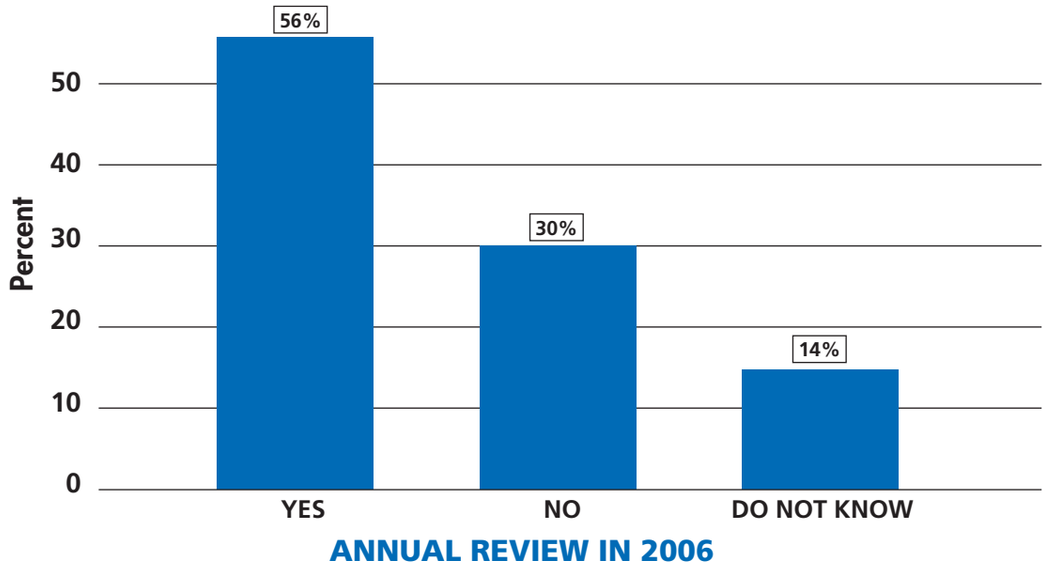


Table 4 shows the recording of various activities with the least recorded activities being microalbuminuria testing and record of eye examinations: 22% (n=57) and 43% (n=111) respectively. Complications of diabetes, smoking status, alcohol intake and physical activity are well recorded i.e. 97% (n=253), 87% (n=228), 87% (n=226) and 76% (n=198) respectively.

At least one record of HbA_{1C} is present in 95% (n=247) of patients (Figure 7). Similarly, 96% (n=249) have one or more Blood Pressure (BP) records (Figure 8), 94% (n=246) have one or more fasting lipids recorded (Figure 9) and 70% (n=182) have one or more recorded BMI (Figure 10) and 84% (n=220) have records of one or more foot examinations (Figure 11).

Table 4: Record of different activities

Activity	YES % (n)	NO % (n)	Do Not Know % (n)
Eyes checked	43 (111)	42 (111)	15 (39)
Microalbuminuria record	22 (57)	34 (87)	45 (117)
Record of complications	97 (253)	3 (8)	0 (0)
Record of smoking status	87 (228)	13 (33)	0 (0)
Record of alcohol intake	87 (226)	14 (35)	0 (0)
Records of physical activity	76 (198)	24 (63)	0 (0)

Figure 6: Annual review visit results on file

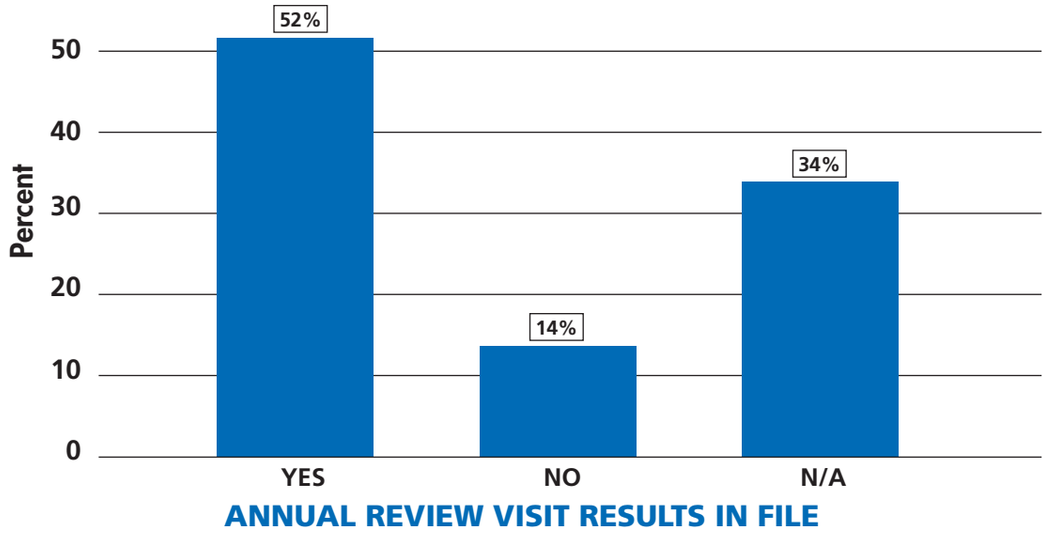


Figure 7: Number of HbA_{1C} records in charts

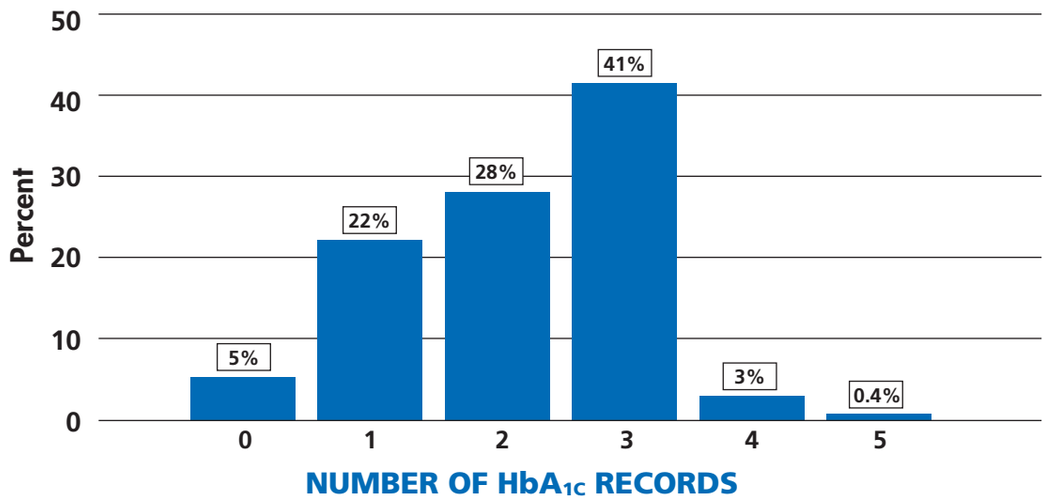


Figure 8: Number of BP records in charts

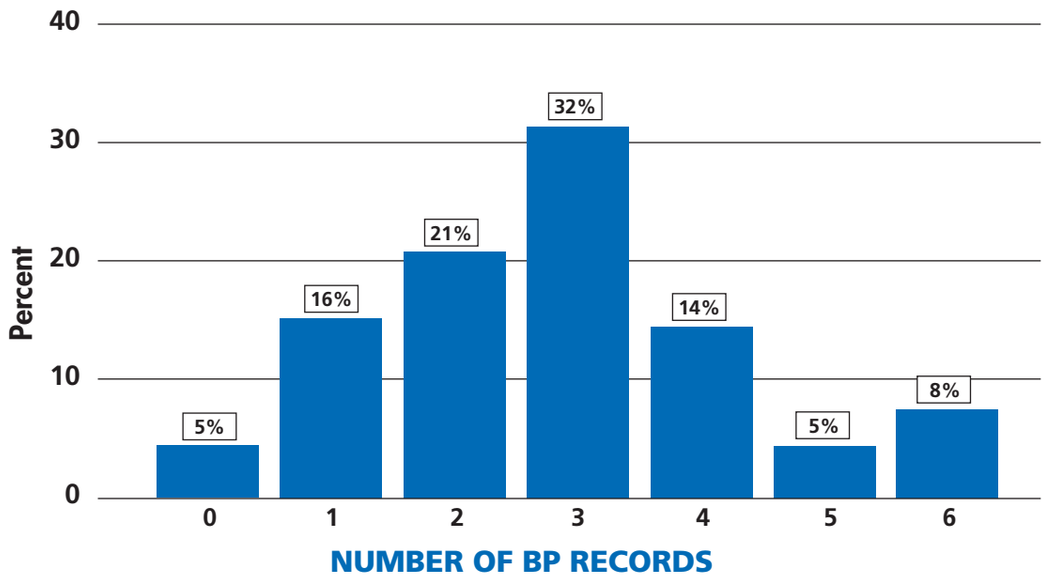


Figure 9: Number of fasting lipid records in charts

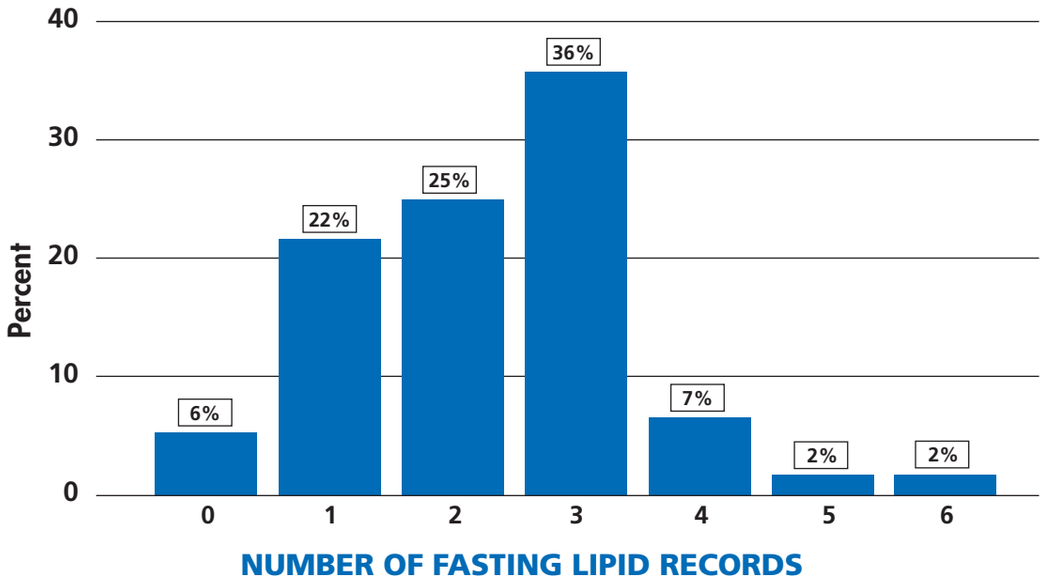


Figure 10: Number of Body Mass Index records in charts

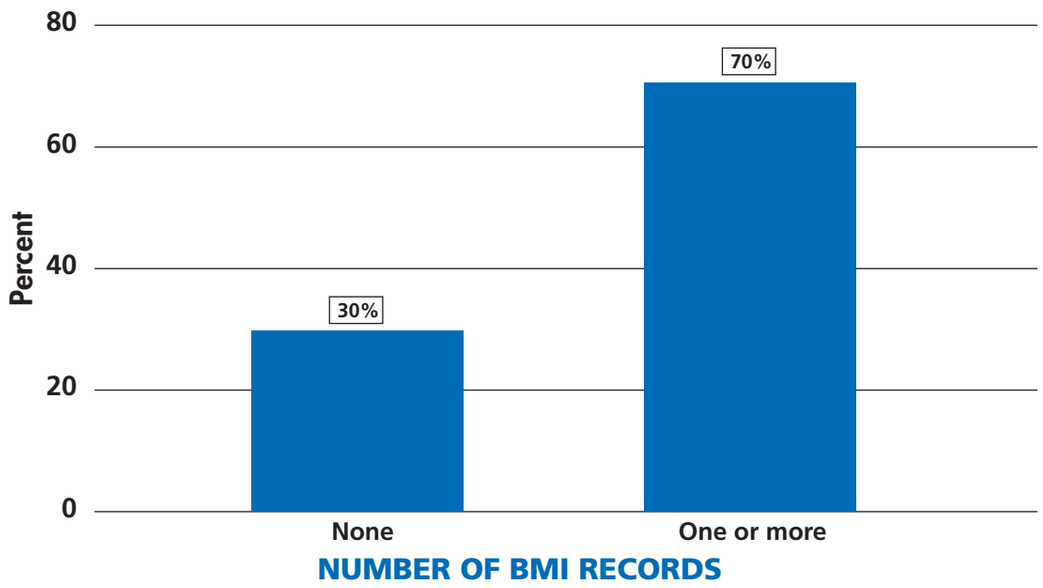


Figure 11: Number of Foot Examination records in charts

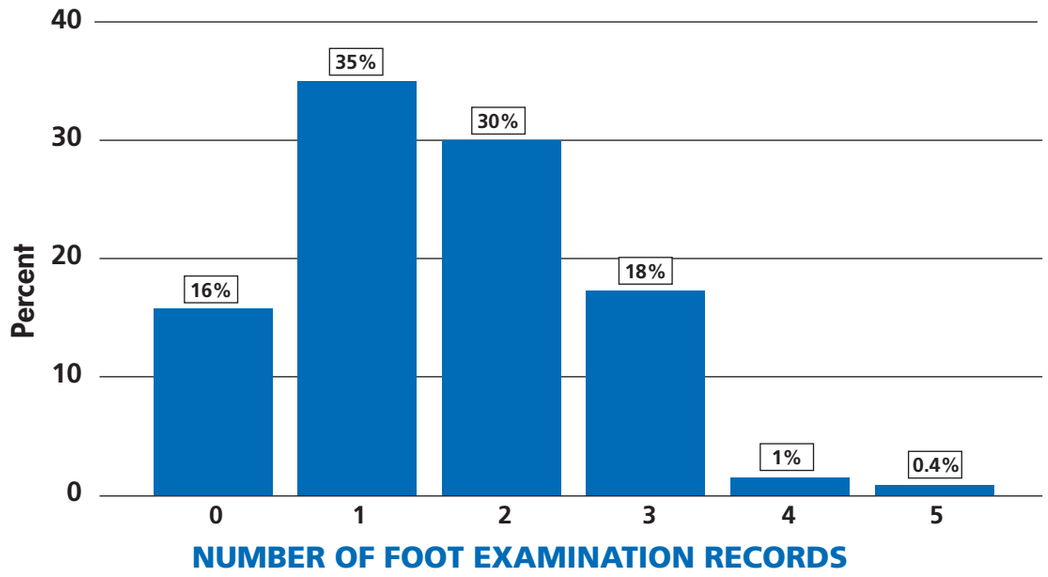
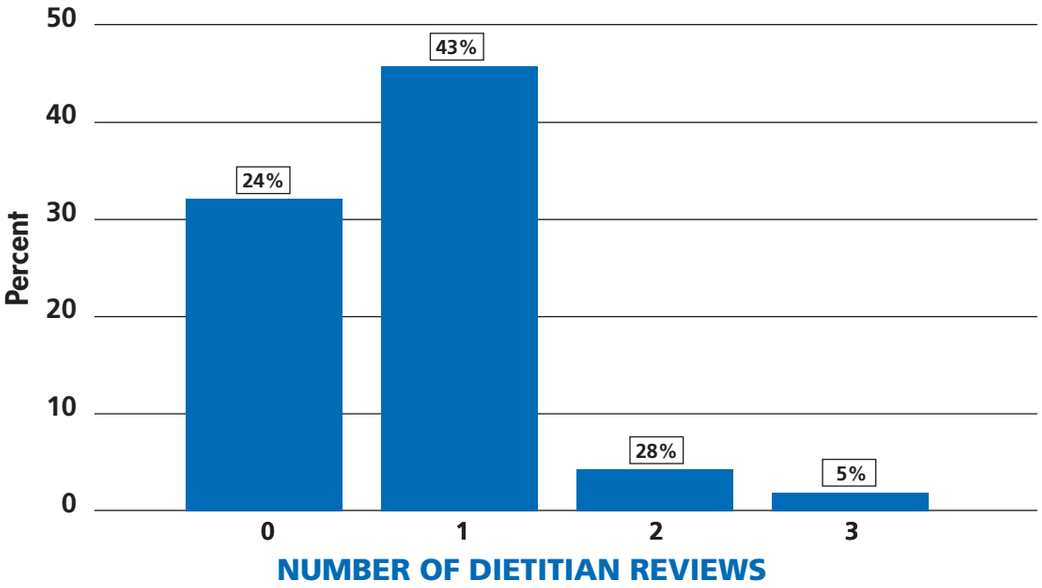


Figure 12: Number of reviews by the Dietician



Regarding Dietetic review, 76% (n=199) of patients had one or more reviews in 2006 (Figure 12). Some 79% (n=205) of patients had one or more reviews with the DNS (Figure 13).

Figure 13: Number of reviews by the Diabetes Nurse Specialist

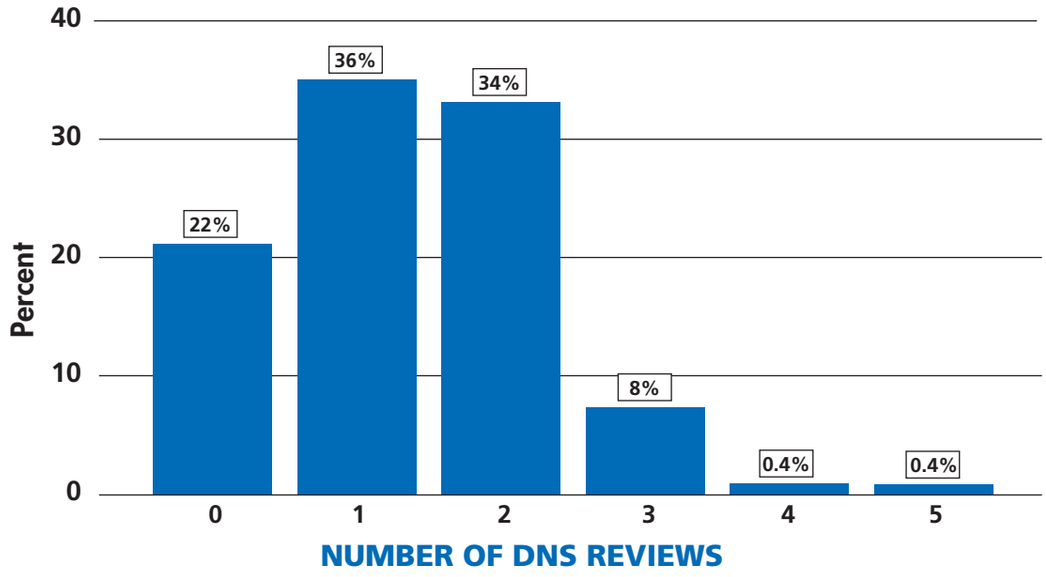


Figure 14: Number of antihypertensive medications

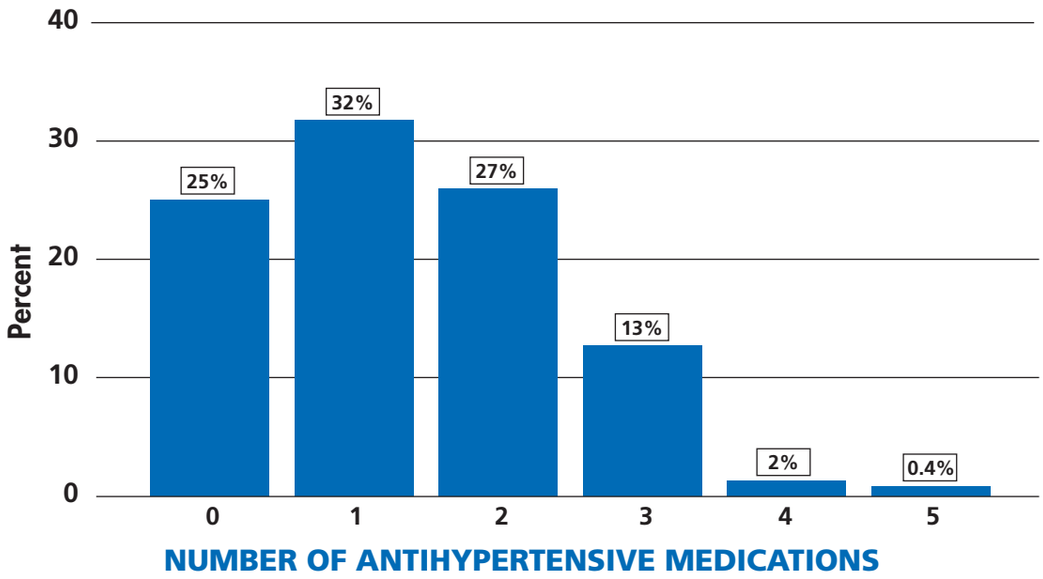


Figure 14 identifies the number of antihypertensive drugs prescribed at the start of 2006. A quarter (n=65) of patients were not on any antihypertensive, while 32% (n=85) were on one, 27% (n=69) were on two, 13% (n=34) were on three, 2% (n=7) were on four and 0.4% (n=1) were on five antihypertensives. During 2006 no changes were made to antihypertensive drug therapy in 74% (n=193) of patients (Figure 15). However, one change was made to oral antihypertensive treatment in 18% (n=46) of patients, two changes were made in 7% (n=17) of patients, three changes were made in 1% (n=3) of patients and four changes were made in 0.4% (n=1) of patients (Figure 15).

Figure 15: Number of antihypertensive medications added/increased/changed

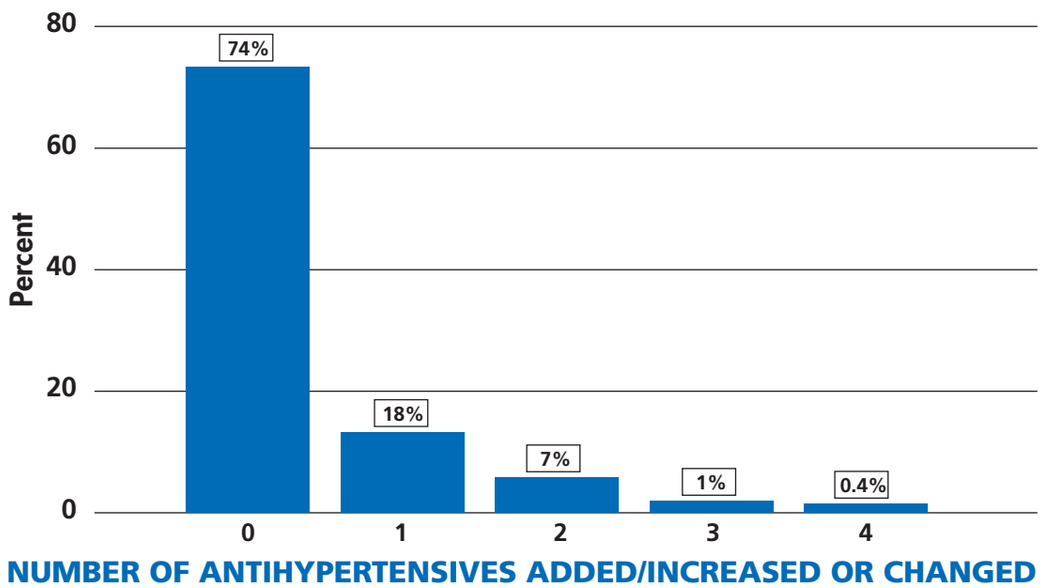


Figure 16: Number of cholesterol lowering medications

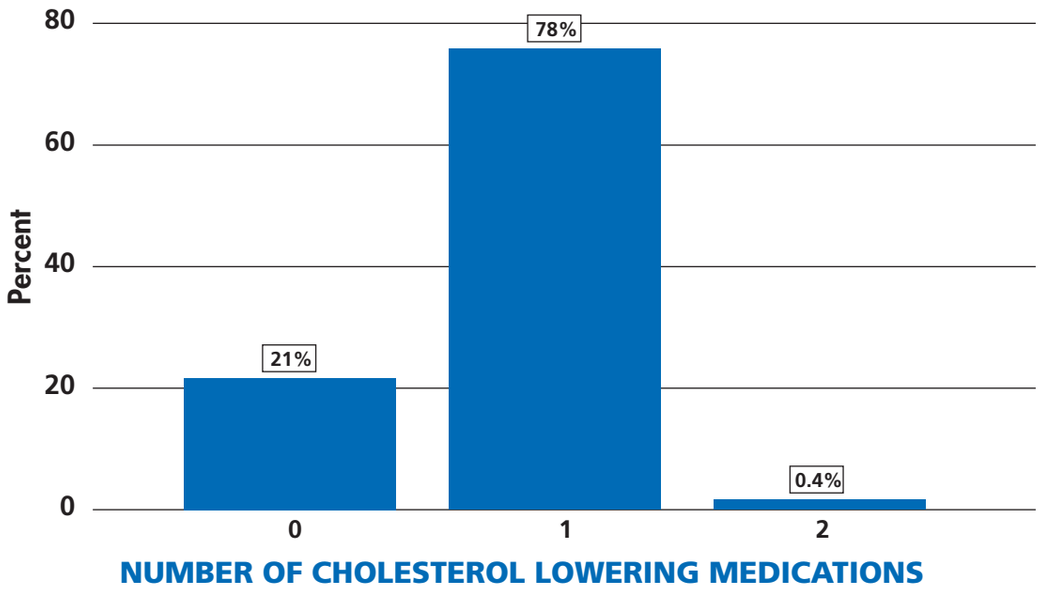


Figure 16 indicates the number of patients on lipid-lowering medications at the start of 2006 with 21% (n=56) not on any lipid-lowering medication, 78% (n=204) on one lipid-lowering medication and 0.41% (n=1) of patients on two lipid-lowering medications. During 2006 no changes were made to lipid-lowering therapy prescriptions in 86% (n=225) of patients while 13% (n=34) and 1% (n=2) of patients had one or two changes made respectively (Figure 17).

Figure 17: Number of cholesterol lowering medications added/increased/changed

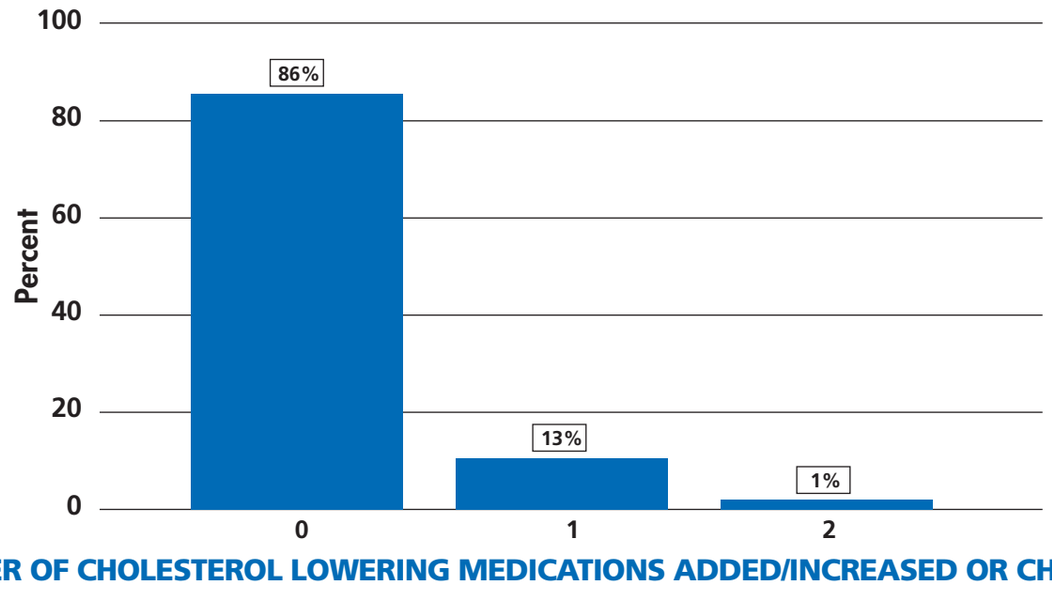
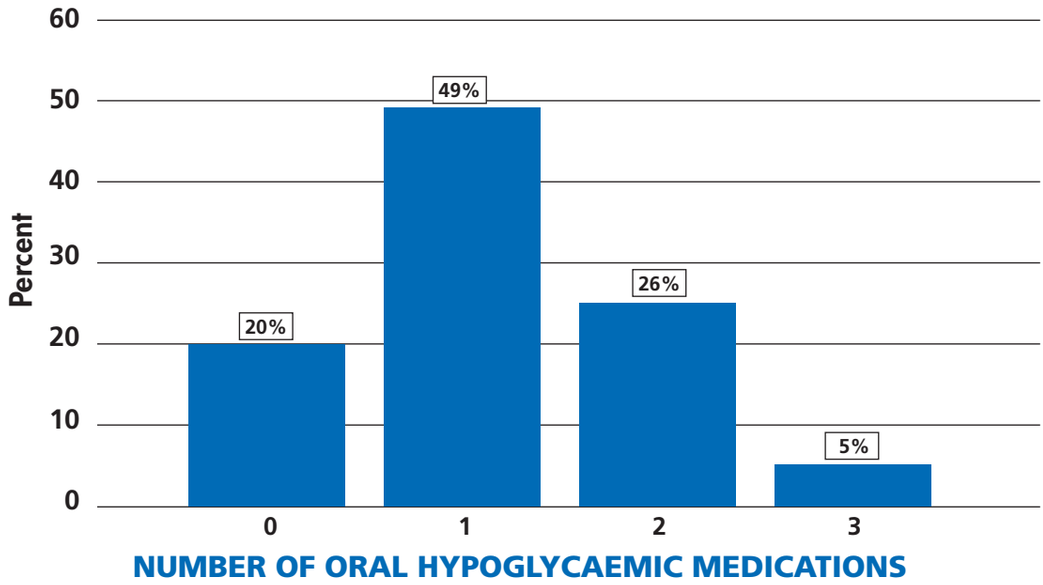
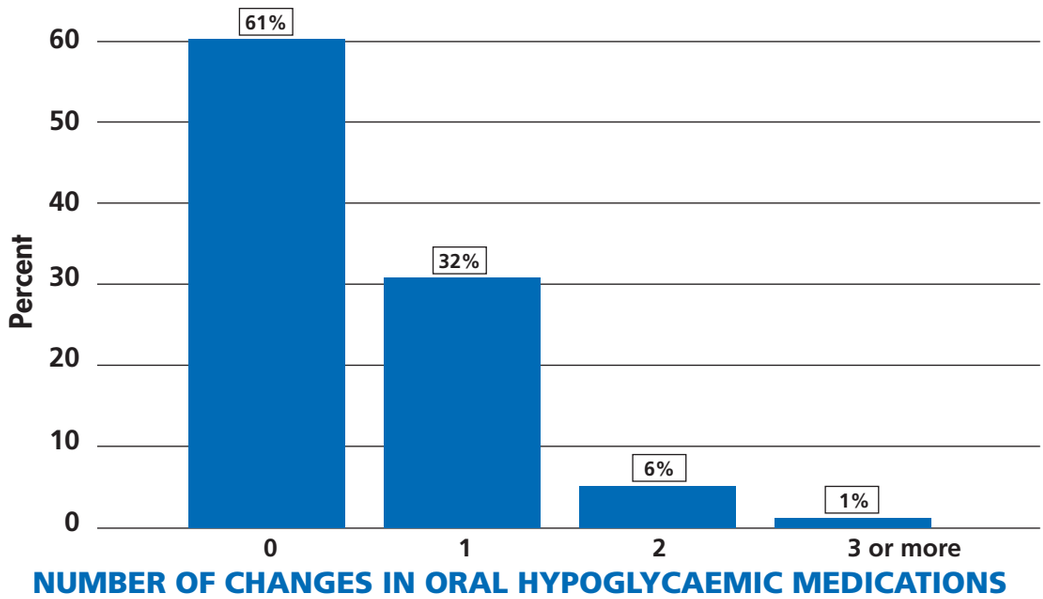


Figure 18: Number of oral hypoglycaemic medications



At the start of 2006 49% (n=128) of patients were prescribed one oral hypoglycaemic (OHG) drug, 26% (n=67) were prescribed two, while 5% (n=14) were prescribed three (Figure 18). Twenty percent (n=52) of patients were not prescribed any OHG (Figure 18). During the audit year the majority of patients had no changes made in terms of starting, changing or increasing OHG drug therapy i.e. 61% (n=159) of patients (Figure 19). However, 32% (n=84) of patients had one change made while 6% (n=16) had two changes made and 1% (n=2) had three or more changes made to OHG drug therapy (Figure 19).

Figure 19: Number of oral hypoglycaemic medications added/increased/changed



The majority of patients are on Aspirin, Plavix or Warfarin therapy i.e. 84% (n=219) (Figure 20). Forty two (16%) are on none of the above. Some degree of activity is identified in relation to Aspirin, Plavix or Warfarin therapy with 38 changes made to above therapy during the audit year.

Figure 20: Number on Aspirin/Plavix/Warfarin Therapy

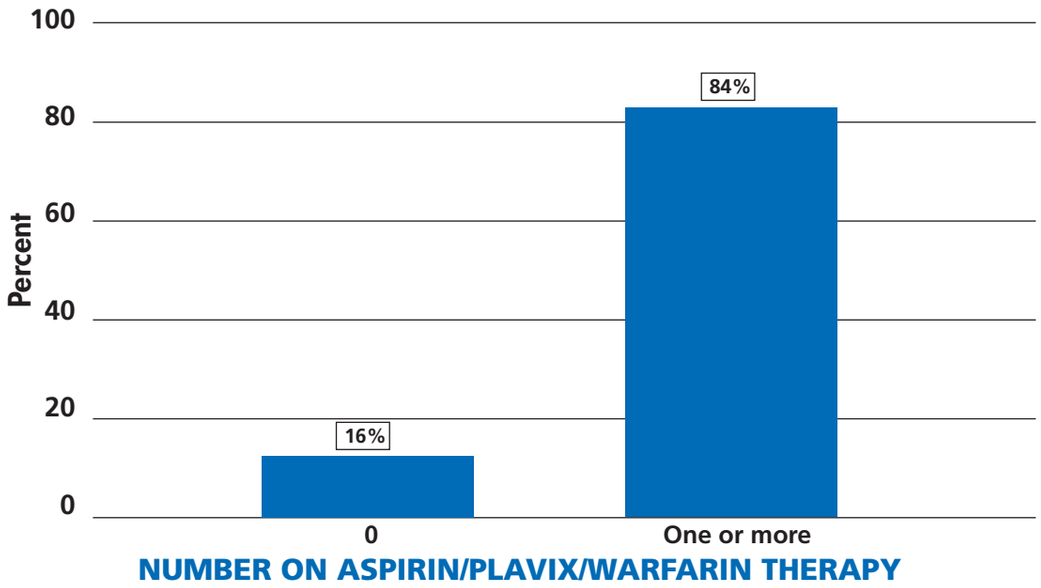


Table 5 illustrates outcomes of care. The mean BMI was 30.4, the mean HbA_{1C} was 6.8%, mean total cholesterol was 4.2mmol/l, mean LDL was 2.1mmol/l, mean HDL was 1.3mmol/l, mean triglycerides were 1.75mmol/l , mean systolic BP was 137 mmHg and the mean diastolic BP was 76mmHg.

Table 5: Outcome of care

Outcome	Mean	n	Minimum	Maximum
BMI	**30.4**	182	20.5	50.4
HbA_{1C}	**6.8%**	229	4.7	13.5
TOTAL CHOLESTEROL	**4.2mmol/l**	229	2.4	8.7
LDL	**2.1mmol/l**	214	0.7	6.2
HDL	**1.3mmol/l**	216	0.6	3.1
TRIGLYCERIDES	**1.75mmol/l**	228	0.4	11
SYSTOLIC BP	**137mm Hg**	232	100	200
DIASTOLIC BP	**76mm Hg**	232	50	105

Table 6 shows the incidence of new recorded complications with 1 (0.4%) patient undergoing lower limb amputation, 5 (2%) patients with new foot ulcers, 5 (2%) patients commencing renal dialysis, 5 (2%) undergoing retinal laser treatment, 13 (5%) patients having a new cardiovascular event, 6 (2%) patients having a major hypoglycaemic event and 16 (6%) patients being admitted to hospital, not necessarily with diabetes related conditions.

Table 6: Incidence of new complications

Complications	% (n)
Amputation	0.4 (1)
New foot ulcer	2 (5)
Renal dialysis/Transplant	2 (5)
New laser treatment	2 (5)
New CV event	5 (13)
Major hypoglycaemia	2 (6)
Hospital admissions (all causes)	6 (16)

3.5 Comparing ECAD Audit 2004 with 2006

There is little change in the availability of the Annual Review report within PHC between the two audits i.e. available for 56% (n=139) patients in 2004 versus 52% (n=146) in 2006 (Table 7). In addition, retinal screening and microalbuminuria screening remain poorly recorded. Patients known to have retina screened in 2004 were 35% (n=87) versus 43% (n=111) in 2006 and patients known to have been tested for microalbuminuria were 18% (n=46) in 2004 versus 22% (n=57) in 2006 (Table 7). However, an improvement in other parameters was evident with recorded foot examinations increasing from 37% (n=91) in 2004 to 84% (n=220) in 2006. In relation to calculation of BMI, there was an increase from 41% (n=101) in 2004 to 70% (n=182) in 2006 (Table 7).

Table 8 compares the main outcomes of this audit with the 2004 audit. Since the 2004 audit, the mean HbA_{1C} has improved marginally by 0.07%. The mean systolic BP has decreased by 2mm Hg and mean diastolic BP has decreased by 1 mm Hg. There have also been reductions in mean total cholesterol by 0.4mmol/l and in mean LDL cholesterol by 0.6mmol/l. More complications have been reported in this audit compared with 2004 data. In particular, commencement of renal dialysis/renal transplant increased from 0% to 2% (n=5), death (from all causes) increased from 0.4% (n=1) to 3% (n=8) and incidence of major hypoglycaemic events increased from 0.4% (n=1) to 2% (n=6). However, incidence of new CVD events reported decreased from 7% (n=17) in 2004 to 5% (n=13) in 2006.

Table 7: Comparison of ECAD Audit: Process of Care in 2004 with 2006

Process of Care	ECAD Audit 2004 (n=249) % (n)	ECAD Audit 2006 (n=261) % (n)
Record of Annual Review in PHC	56 (139)	52 (146)
Record of Retinal Screening	35 (87)	43 (111)
Record of Microalbuminuria Screening	18 (46)	22 (57)
Record of Foot Examination	37 (91)	84 (220)
Calculation of BMI	41 (101)	70 (182)

Table 8: Comparison of ECAD Audit Outcomes in 2004 with 2006

Parametre	Findings ECAD 2004 (n=249)	Findings ECAD 2006 (n=261)
Mean HbA_{1c}	6.87%	6.80%
Mean Blood Pressure	139/77mmHg	137/76mmHg
Mean Total Cholesterol	4.6mmol/l	4.2mmol/l
Mean LDL Cholesterol	2.7mmol/l	2.1mmol/l
CVD Events	7% (n=17)	5% (n=13)
Laser Treatment	0.8% (n=2)	2% (n=5)
Started Dialysis/Renal Transplant	0% (n=0)	2% (n=5)
New Foot Ulcer	2% (n=4)	2% (n=5)
Amputation	0% (n=0)	0.4% (n=1)
Death due to all Causes	0.4% (n=1)	3% (n=8)
Major Hypoglycaemia	0.4% (n=1)	2% (n=6)

4.0 COMPARING ECAD OUTCOMES OF CARE WITH PATIENTS ATTENDING HOSPITAL ONLY

4.1 Aims

To compare the outcome of care between the shared care group and a hospital group matched for age, sex, duration of diabetes and BMI.

4.2 Methodology

The hospital group was randomly selected from a computerised personal diabetes data record (TYMAX) in SVUH to match the Shared Care group in age, sex, duration of diabetes and BMI. Data was collected using an Excel Spread Sheet. Data was collected from 145 patients.

4.3 Statistical Analysis

Data was analysed using the SPSS software. Paired t-test was used to test the difference between the two groups. $p \leq 0.05$ was considered as significant.

4.4 Results

Table 9 shows the baseline characteristics of the two groups. There were no significant differences between the two groups in terms of sex, age, duration of diabetes and BMI.

Table 10 shows the main outcomes of the two groups. The shared care group has significantly higher mean systolic BP (137mmHg vs.132mmHg) than the hospital group (p=0.001). Similarly the mean diastolic BP was significantly higher in the shared care group (76mmHg vs. 73mmHg) than the hospital group (p=0.001). The mean HbA_{1C} appeared to be lower in the shared care group (6.8% vs. 7.2%) but this was not statistically significant. The mean total cholesterol was significantly higher in the shared care group (4.2mmol/l vs. 4.1mmol/l) than in the hospital only group. There were no significant differences in the LDL (2.1mmol/l in shared care vs. 2.1mmol/l in hospital only group), HDL (1.3mmol/l in shared care vs. 1.4mmol/l in the hospital only group) and triglycerides (1.75mmol/l in shared care vs.1.5mmol/l in hospital only group).

Table 9: Baseline characteristics of shared care and hospital only groups

	Shared Care n=261	Hospital n=145	p value
Sex	Males 57% (n=149) Females 43% (n=112)	Males 58% (n=84) Females 42% (n=61)	
Age	65 years	63 years	p=0.140
Duration of Diabetes	6.6 years	7 years	p=0.207
BMI	30.4	31.3	p=0.278

Table 10: Outcomes of care in shared care and hospital only groups

	Shared Care (n=261)	Hospital (n=145)	P value
Systolic BP	137mmHg	132mmHg	0.001 *
Diastolic BP	76mmHg	73mmHg	0.001 *
HbA_{1c}	6.8%	7.2%	0.084
Total Cholesterol	4.2mmol/l	4.1mmol/l	0.038 *
LDL	2.1mmol/l	2.1mmol/l	0.154
Triglycerides	1.75mmol/l	1.5mmol/l	0.148
HDL	1.3mmol/l	1.4mmol/l	0.061

* statistically significant

5.0 DISCUSSION

The data from the 2006 ECAD audit demonstrates how patients in the shared care system are well integrated into the system as is evident by the high rate of attendance at PHC clinics. Metabolic results, clinical examination and education are consistently and adequately recorded. Disappointingly, there was no improvement in recorded attendance at annual review within secondary care from the 2004 audit i.e. 56% (n=139) in 2004 and 52% (n=146) in 2006. This might be due to copies of hospital visit records not being available to the GP at the time of the audit as shown in Figure 6. This reflects an ongoing problem with communication of contemporaneous information between secondary and PHC.

In addition, the data shows that the recording of screening at annual review is poor with eye examinations recorded in just 43% (n=111) of patients and microalbuminuria in 22% (n=57) of patients. This is a slight improvement on findings in the 2004 audit (i.e. retinal screening 35% (n=87) of patients and microalbuminuria screening 18% (n=46) of patients but is far below what can be considered adequate. This may be explained by the current recording system which does not allow for an entry to identify if the eyes have been examined. In addition, some patients attend a range of dedicated eye clinics and feedback from these clinics is often lacking. The low rates for recording microalbuminuria are associated with the current system of screening in SVUH and SMH whereby results are not available on the day of the clinic visit. Therefore, results are entered after the clinic visit and after reports have been forwarded to GPs. This is not a problem in SCH as albumin creatinine ratio is assessed and recorded at the clinic visit.

In relation to low levels of BMI calculation and recording of foot examinations found in the 2004 audit, there appears to be a marked improvement in the 2006 audit. BMI calculation increased to at least one calculation recorded per patient in 70% (n=182) of patients and at least one foot examination was performed in 84% (n=220) of patients.

Comparing the mean outcomes of care between the 2004 and 2006 audits demonstrates improvement in HbA_{1C}, systolic and diastolic BP, total cholesterol and LDL cholesterol. Mean total cholesterol and LDL reached International Diabetes Federation (IDF)[17] targets. The incidence of new complications continues to be low in the 2006 audit. This may be due to the fact that the average duration of diabetes in the audit group is 6.6 years. However, incidence of new complications in 2006 is higher than in 2004 for new foot ulcers, amputation, death, major hypoglycaemia, dialysis and laser treatment. This may be due to the chronic nature of diabetes with its associated risk of complications. In relation to incidence of documented severe hypoglycaemia, the increase between 2004 and 2006 may be associated with increased awareness of this risk amongst healthcare professionals. On a positive note, there was a lower incidence of CVD events recorded which may reflect the "treat to target policy" adopted by ECAD.

In comparing the outcomes of care between the shared care group and the hospital only group, mean HbA_{1C} was higher in the hospital only group, but was not of statistical significance. The mean LDL, HDL cholesterol and triglyceride levels were comparable between the two groups and compare favourably with international guidelines. Although mean total cholesterol levels were significantly higher in the shared care group, they were within the target set by the IDF.

Mean systolic and diastolic BPs were significantly higher in the shared care group versus the hospital only group. In both groups diastolic BP was within the IDF target. However in both groups systolic BP was above the target. There is general consensus that up to 3 – 5 antihypertensive drugs may be required for adequate control of hypertension[19]. However, just 16% (n=42) of patients are on 3 or more antihypertensive drugs and 74% (n=193) of patients had no change made to drug therapy during 2006. This may go some way towards explaining the higher, above target systolic BP in the shared care group.

In conclusion, this audit along with the 2004 audit serves to confirm the benefits of shared care management of people with Type 2 DM whilst highlighting areas for improvement. In addition, it will provide a wealth of data for comparison with subsequent audits of the programme.

6.0 RECOMMENDATIONS

(1) This audit demonstrates that, across a range of parameters, GPs within the shared care programme are delivering care of equivalent standards to hospital only care. The shared care programme at present is delivered to 400 patients i.e. 1% of the diabetes population within the former ERHA. Therefore, an expansion of the shared care programme is recommended so that a wider range of patients may be reached.

(2) The findings of the hospital annual review visit need to be communicated to the appropriate GP. This should take place in a timely fashion and should include information on eye, lower limb and renal assessments.

(3) Steps to reduce the disparity between BP control between patients attending hospital care only and those within the shared care programme should be implemented. A series of educational updates on optimum BP management to ECAD participants is recommended.

(4) These audit findings should be published and circulated.

(5) ECAD should continue to be audited on a regular basis to ensure maintenance and enhancement of standards of care.

7.0 REFERENCES

(1) World Health Organization (1999); *Definition, Diagnosis and Classification of Diabetes Mellitus and its Complications.*
www.who.int

(2) National Service Framework for Diabetes (2002); *Modern Standards and Service Development UK.* Department of Health, UK.

(3) Diabetes UK (2000); *Recommendations for the Management of Diabetes in primary Care.* 2nd edition. Diabetes UK.

(4) Report of the Diabetes Service Development Group (2002); *Diabetes Care Securing the Future*. Diabetes Service Development Group Facilitated by the Diabetes Federation of Ireland.

(5) Kohner EM, Stratton IM, Adlington SJ, Turner RC (1999) UKPDS Group; *Diabetologia* **42**, 1107-1112.

(6) The Diabetes Control and Complications Trial Research Group (1993); *The effect of intensive treatment of diabetes on the development and progression of long term complications in insulin-dependent diabetes mellitus.* NEJM **329**, 977-86.

(7) Epidemiology of Diabetes Interventions and Complications Study (2005); *Intensive Diabetes Treatment and Cardiovascular Disease in Patients with Type 1 Diabetes.* NEJM **353**, 2643-2653

(8) Gæde P, Andersen H, Parving H, Pedersen O (2008); *Effect of a Multifactorial Intervention on Mortality in Type 2 Diabetes*. STENO 2 Group. *NEJM* **358**, 580-591.

(9) World Health Organization (2006); *Definition and diagnosis of Intermediate Hyperglycaemia.*
www.who.int

(10) Institute of Public Health in Ireland (2006); *Patterns of Diabetes on the Island of Ireland.*
www.publichealth.ie

(11) Eastern Regional Health Authority (2000); *Diabetes Proposal.* Diabetes Review Group, Eastern Regional Health Authority.

(12) American Diabetes Association (2008); Economic Costs of Diabetes in the U.S. in 2007*, Diabetes Care* 31, 596-615

(13) Irish College of General Practitioners Task Group (2000); *Guidelines for Diabetes Care in the Community.*

(14) Smith S, Bury G, O'Leary M, Shannon W, Tynan A, Staines A and Thompson C (2004); The North Dublin randomized controlled trial of structured diabetes shared care. *Family Practice* **21**, 1, 39-45.

(15) Simon N (1994); Integrated care for diabetes: clinical, psychosocial, and economic evaluation for the Diabetes Integrated Care Evaluation Team *BMJ* **308**, 1208-1212.

(16) Greenhalgh P.M. (1994); *Shared Care for Diabetes: A Systematic Review.* London: Royal College of General Practitioners, Royal College of General Practitioners Occasional Paper: 67.

(17) International Diabetes Federation (2005); *Global Guideline for Type 2 Diabetes*
www.idf.org

(18) National Audit and Governance Group in *How to Apply Ethics to Clinical Audit.*
Produced by UBHT Clinical Audit Central Office
http://www.ubht.nhs.uk/clinicalaudit/docs/HowTo/WhatisCA.pdf

(19) British Hypertension Society and NICE (2008); *Choosing Drugs for Patients Newly Diagnosed with Hypertension.*
www.bhsoc.org

8.0 APPENDIX

PARTICIPANTS IN ECAD, 2006

Members of ECAD Steering Group

Prof. Donal O'Shea, Professor Endocrinology SCH, SVUH
Dr Ronan Canavan, Consultant Endocrinologist SCH, SVUH
Dr Gianluca Tamagno, Lecturer Endocrinology SVUH
Dr Tony O'Sullivan, GP, Irishtown, Dublin 4
Dr Niall Cleirigh, GP Unit Doctor, GP, Pearse Street, Dublin 2
Deirdre Hall, Diabetes Nurse Specialist, Department of Primary Care, HSE Dublin / Mid-Leinster
Yvonne Ryan, Senior Dietitian, Department of Primary Care, HSE Dublin / Mid-Leinster
Janet Mathias, Senior Dietitian, Department of Primary Care, HSE Dublin / Mid-Leinster
John Fennell, Primary Care Unit Manager, HSE Dublin / Mid-Leinster
Bill Seery, Administrator, Primary Care Unit, HSE Dublin / Mid-Leinster

General Practitioners in ECAD

Dr Anthony Bentley, Arklow, Co. Wicklow
Dr Craig Bishop, Kilcoole, Co. Wicklow
Dr Truls Christiansen, Wicklow Town
Dr Desmond Connolly, Bray, Co. Wicklow
Dr Padraic Doherty, Sallynoggin, Co. Dublin
Dr Damien Doyle, Carnew, Co. Wicklow
Dr Deirdre Kinlen, Sandycove, Co. Dublin
Dr Niall O'Cleirigh, Pearse Street, Dublin 2
Dr Tony O'Sullivan, Irishtown, Dublin 4
Dr John Redmond, Blackrock, Co. Dublin
Dr Bridget Sheehy, Blackrock, Co. Dublin
Dr Niall Webb, Sandycove, Co. Dublin

Practice Nurses in ECAD

Helen Bentley – Dr Anthony Bentley's practice
Sonniva Doyle – Dr Damien Doyle's practice
Jean Harris – Dr Craig Bishop's practice
Fiona Merry – Dr Truls Christiansen's practice
Hilary Moran – Dr Craig Bishop's practice
Annie O'Reilly – Dr Padraic Doherty's practice
Catriona O'Sullivan – Dr Tony O'Sullivan's practice
Mary Reville – Dr Niall O'Cleirigh's practice
Jackie Ward – Dr Craig Bishop's practice

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Designed and Printed by HSE Print & Design
Tel: 626 3447 Fax: 626 3159