Abstracts from the Association of British Clinical Diabetologists (ABCD) meetings

Abstract from the Autumn 2005 meeting
Gestational diabetes screening and management. National audit on behalf of the Association of British Clinical Diabetologists

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Background: There is no consensus for screening methodology, diagnosis and management of gestational diabetes mellitus (GDM).
Aim: To evaluate routine practice for GDM management across the UK.
Methods: Questionnaires were sent to all members of the Association of British Clinical Diabetologists. They were asked to describe how patients were screened for GDM, the diagnostic criteria and subsequent management and clinical targets. Centres that did not respond were followed up by personal communication.
Results: The response rate averaged 46% nationally (35–67%). Most (85%) units had a joint clinic, regardless of the size. Most (82%) centres routinely screened for GDM: half universally and half screening high risk pregnancies only. Screening tests, cut-off values, timings and subsequent action varied widely (see Table).

	RPG	FPG	Glyco-suria	High risk features
% Use as 1st screening test	28%	6%	40%	11%
Timing (week gestation)	24–28 w: 29% Booking: 36%	24–28 w: 39% >28 w: 13%	Each visit: 82%	24–28 w: 50% Booking: 20%
Cut-off values	>6mmol/L: 67% 5.6–6 mmol/L: 14%	>6mmol/L: 40% 5.6–6 mmol/L: 30% 5–5.5 mmol/L: 18%		
Further action, if positive screen	OGTT: 76% Diet/HBGM: 9% FPG: 9%	OGTT: 74% Diet/HBGM: 19%	OGTT: 55% RPG: 22%	OGTT: 73% Diet/HBGM: 8% FPG: 8%

RPG: random plasma glucose; FPG: fasting plasma glucose; HBGM: home blood glucose monitoring; OGTT: oral glucose tolerance test.

The 75g OGTT was the most likely confirmatory test to be used if initial screening was positive. Most (95%) centres routinely assess foetal growth. Post-partum screening is undertaken by 90%, using a 75g OGTT (93%). Most (90%) centres counsel patients about their high risk for further GDM and type 2 diabetes.
Conclusion: GDM screening and management practice vary widely across the UK. However, most centres utilise the 75g OGTT for confirming the diagnosis and post-partum assessment.

Abstracts from the Spring 2006 meeting
(P1): ABCD nationwide audit of insulin avoidance by use of triple oral therapy in type 2 diabetes

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Because, in 2004, the addition of glitazones to sulphonylureas and metformin was not licensed in the UK, an e-mail was sent to over 300 ABCD members inviting them to submit, to a secure website, anonymous details of patients in whom this approach successfully led to insulin avoidance.

Eighty-three such patients were submitted in whom HbA1c fell to <8%: mean(±SD) age 63.7(±9.9) years, duration of diabetes 10.7(±5.4) years; 47/83 (57)% male. 13.7(±9.8) months after commencement of rosiglitazone in 59/83 (71%) or pioglitazone in 24/83 (29%), HbA1c fell from 9.3(±1.4)% to 7.1(±0.5)%. The fall in HbA1c was ≥3% in 16/83 (19%), >4% in 6/83 (7%), and >6% in 3/83 (4%). BMI rose from 29.8(±5.8) to 30.8(±6.8) (p=0.0013) in the 32 patients in whom these data were submitted. The impact of the glitazone on glycaemic control was sometimes considerable and sustained: e.g. in response to the addition of pioglitazone 30mg, HbA1c fell from 14.3% to 7.5% over 24 months in 1 patient and from 10.4% to 6.9% over 31 months in another. Hypoglycaemia was reported in 15/83 (15%), worsening of ankle oedema in only 1/83 (1%) and worsening of breathlessness in only 1/83 (1%). However, many respondents were uncertain as to whether these problems had occurred.

These data highlight the considerable and sustained beneficial impact on glycaemic control of the addition of glitazones to maximal doses of sulphonylurea and metformin in some patients, and demonstrate that in such patients insulin therapy can be thereby avoided or postponed. There does not seem to be a level of HbA1c at which such a triple oral therapy approach may not be worth trying.

(P2): ABCD nationwide audit of successful use of glitazones and insulin in combination in the UK

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The insulin/glitazone combination is contraindicated in the UK. Despite this, some specialists try it in occasional patients, particularly those with extreme insulin resistance. An e-mail was sent to over 300 ABCD members inviting them to submit, to a secure website, anonymous details of patients in whom this approach was successful.

Data were submitted on 11 such type 2 patients, mean(±SD) age 55(±18) years, duration of diabetes 12.2(±5.5) years; 5/11 (45%) male. 18(±9.8) months after commencement of rosiglitazone in 8/11 (73%) or pioglitazone in 3/11 (27%), HbA1c fell from 8.7(±0.82)% to 7(±0.44)%, insulin dose from 135(±98)IU to 80(±71)IU (p=0.014) and BMI rose from 33.4(±5.7) to 34.5(±6.5) in the 8 patients in whom these data were submitted. 5/11 (45%) patients experienced worsening of ankle oedema but none experienced worsening of breathlessness. 3/11 (27%) experienced hypoglycaemia, all for the first time in their lives. In some the impact was dramatic: e.g. daily insulin dose reductions (IU) from

200 to 64, 260 to 100 and 290 to 150 accompanied by HbA_{1c} falls from 9.5% to 7%, 7.7% to 7% and 8.3% to 6.4%, respectively.

The small number of responses to this nationwide search for successful cases could reflect not only the very low usage of the contraindicated combination but also the possibility of a low success rate amongst the difficult cases in which it is tried, as a last resort, in the UK. For example, 1 respondent commented that out of 8 patients with extreme insulin resistance on extremely high doses of insulin in whom he had tried the combination, it had been successful without significant side effects in only 2.

Patients with extreme insulin resistance may sometimes respond with dramatic success to the combination of glitazones with insulin. However, for many, in this difficult patient group, the approach may be unsuccessful.

(P3): Difficulties in insulin allergy management

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Allergic reactions to exogenous insulin have occurred since the introduction of animal insulin in 1922, with initial prevalence rates of over 50% being recorded. The prevalence has now fallen to 2.5% with the use of recombinant human insulin. Insulin-induced reactions commonly are isolated to injection sites. Systemic effects are rare but can cause profound morbidity. Here we present our experience of managing two cases:

1: A 66-year-old female type 2 patient developed cutaneous allergy associated with high titre IgG anti-insulin antibody following initiation of insulin, which persisted despite repeated changes in insulin preparation. Following treatment with antihistamines and steroids, there was a marked improvement in glycaemic control. Subsequently she was started on CSII as part of a desensitisation programme and has maintained good control since.

2: A 59-year-old female patient with type 1 diabetes had a 9-year history of generalised symptoms secondary to insulin allergy. The patient had resulting poor glycaemic control (HbA_{1c} 10%). We used a complex regimen of antihistamines and prednisolone to attempt to achieve symptom and glycaemic control. Despite this and CSII, only limited improvement was achieved, but at the expense of disabling steroid-induced effects (including dementia). At present we are attempting targeted immunosuppressive therapy.

These 2 cases illustrate the difficulty in managing this rare phenomenon given the limitations of available data to support decision making.

(P4): eGFR in a general diabetes clinic population

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Part 2 of the Renal National Service Framework recommends that biochemistry labs should report an estimated GFR (eGFR). Many of the drugs used in diabetic patients either have effects on renal function or require changes in their usage when renal function is significantly impaired.

We used our diabetes annual review database to calculate the 4-parameter (age, sex, creatinine and race) eGFR for the year 2004. Since race is not routinely recorded we assumed that all patients were non-Afro-Caribbean. This will have minimally biased the eGFR in favour of lower results.

Analysis of the diabetes database demonstrates a typical skewed distribution of creatinine values with a mean 105.6 (SD 50.6), median 96. Mean age for the clinic is 68.3 (SD 16.4), with a median age of 71.

Calculated eGFR ranged from 7.04–139.54ml/min, with a mean of 66.6 (SD 19.8). Median eGFR was 67.6, with the 25th and 75th centiles at 54.9 and 79.1. 34.3% of eGFRs were <60 and 4.3% were <30ml/min.

Therefore, there is a significant proportion of patients whose eGFR is low enough to prompt changes in drug treatment or investigation for renal dysfunction. This is partly related to patient age. One possible confounder is the frequent use of ACEIs in patients with diabetes, which will adversely but reversibly affect eGFR. The data from our clinic suggest that early development of guidelines relating diabetes and cardiovascular treatments to eGFR will be of value to medical staff unfamiliar with the significance of eGFR, and also to patients.

(P5): Erythropoietin therapy as an adjunct to treatment of diabetic foot ulceration

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It is well documented that patients with diabetes have a blunted endogenous erythropoietin (EPO) production for their level of anaemia compared with iron deficient controls. This may adversely affect many existing diabetic complications. We report on a 71-year-old woman with type 2 diabetes who presented with a neuro-ischaemic foot ulcer and symptomatic anaemia, complicated by biventricular cardiac failure. She had required home oxygen therapy for fatigue, dyspnoea and weakness for the preceding 2 years.

With poor glycaemic control, she had advanced microvascular disease and peripheral vascular disease. Her BP was 110/54. Creatinine over the past 2 years ranged from 160–200mmol/L with clearance of 22ml/min. Inflammatory markers were raised (ESR 89mm/hr, CRP 176mg/L). A normochromic, normocytic anaemia (Hb 8.4–9.6g/dl, MCV 81fL, PCV 0.27) with adequate haematinics (ferritin 88–367ng/ml, vit B12 >2000ng/L and folate >24ug/L) was diagnosed. Her EPO level was found to be 11.2iU/L.

Standard measures for foot ulcer treatment were implemented and EPO therapy at 20iU SC once weekly was also commenced. PCV increased by >20% to a peak of 0.35 within 3 months, associated with Hb rise to a peak of 11.4 g/dl. There was complete amelioration of her symptoms of tiredness and lassitude and of oxygen dependence, and considerable improvement in quality of life. Improvement of peripheral oedema resulted in rapid healing of the foot ulcer.

Although the effects of erythropoiesis normalisation on the long-term outcome are unknown, early EPO therapy will help the management of many co-morbidities associated with chronic diabetic complications.

(P6): The effect of smoking, obesity, duration of diabetes and poor glycaemic control on higher prevalence of history of myocardial infarction among people with diabetes from more deprived areas than from less deprived areas

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The prevalence of cardiovascular disease (CVD) risk factors including obesity and smoking among people with both type 1 and type 2 diabetes is higher among people of lower socio-economic status (SES). It is not clear whether any effect of SES on CVD risk can be explained by differing prevalence of risk factors. We used data from the population-based Lothian diabetes register of 25 751 people (3.2% of the total Lothian population) linked to hospital-admission data in November 2005 to examine the relationship between SES (as reflected by deprivation category derived from the Carstairs index), smoking status, body mass index (BMI), and hospital admission with myocardial infarction (MI). There were 2482 people with type 1 diabetes (of whom 84 had had an MI) and 16 238 people with type 2 diabetes (of whom 1545 had had an MI) for whom data were available on all relevant variables. The prevalence of current smoking and obesity (BMI >30kg/m^2) in the most deprived quintile was 31% and 67%, compared with 15% and 54% respectively in the most affluent quintile. The age, sex and type of diabetes adjusted odds ratio (OR)

for MI (95% confidence interval) among people in the most deprived category compared to those in the most affluent category was 1.53 (1.25–1.88). Further adjustment for current smoking status and BMI attenuated the OR to 1.39 (1.11–1.74). Low SES is associated with increased prevalence of CVD among people with diabetes and this relationship is only partially explained by the confounding effects of obesity and smoking.

(P7): Comparison of care pathway based costing models for new type 1 and type 2 diabetes: 'EXPERT advice is not expensive'

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With modernisation in the funding within the NHS through Payment by Results, the need for a robust financial model for an integrated diabetes network is highlighted. We submit a care pathway based costing paradigm comparing per-patient costs of management for newly diagnosed type 1 (T1DM) and type 2 diabetes mellitus (T2DM) within the Diabetes Network in Hull and East Riding of Yorkshire.

Methods: Care pathway models for diagnosis and stabilisation of T1DM and T2DM were developed by key staff and endorsed by stakeholders. Costs across the local health care communities based on the care pathways are estimated using known incidence and prevalence statistics. Costs for DAFNE and EXPERT programmes are calculated to illustrate expenditure for patient education.

Results: For 2006, the projected per-patient cost of newly diagnosed T2DM is £141.54, of which £52.69 is the cost of the EXPERT education programme. Comparable costs for new T1DM are £582.16 of which £270.34 is for DAFNE. Projected network costs for 2006 are £116 626.14 for 824 new T2DM (£43 420.28 for EXPERT) and £32 019.03 for 55 new T1DM (£14 868.49 for DAFNE).

Conclusions: The care pathway based costing model presents a transparent, predictable and flexible means of projecting expenditure for the commissioners. Our comparative cost projections illustrate that patient education for T2DM is relatively inexpensive and is unlikely to impose a heavy financial burden on network finances. The care pathway based approach highlights the fact that the cost of education is liable to be overlooked in Payment by Results.

(P8): Neutrophilia as a presenting feature of Cushing's disease?

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The pathophysiological action of steroids on the blood count is to cause leucocytosis, with neutrophilia, lymphopenia, eosinopenia and monocytopenia. We report on a 27-year-old lady, who was referred to the haematology clinic with thrombocytosis post-natally. Neutrophilia had been documented 3 years previously. She was investigated extensively and myeloproliferative conditions were excluded. Having developed diabetes, hirsutism and Cushingoid facies she was referred to the endocrine clinic. Her blood counts revealed haemoglobin of 14.6, white cell count (WCC) 16.7 (neutrophils 12.4) and platelets of 391. Androgen levels amounted to a testosterone of 2.6nmol/L (0.4–2.8), androstenedione 8.7nmol/L (1.4–9.4) and a DHEAS of 8.5nmol/L (1.8–10.3). Thyroid functions and pituitary gonadotrophins were normal.

The 9am cortisol level after 1mg of dexamethasone the previous midnight was 194nmol/L. The baseline ACTH was elevated at 91.8ng/L. Cortisol levels did not suppress after low dose (0.5mg) dexamethasone 6-hourly (649nmol/L and 441nmol/L at 0 and 48 hours respectively) but suppression was achieved with high dose (2mg) of dexamethasone 6-hourly (441nmol/L and 48nmol/L). The dexamethasone responses favoured Cushing's disease and an MRI of the pituitary gland revealed a left-sided micro-adenoma. The patient underwent a trans-sphenoidal hypophysectomy and 4 weeks post-surgery the blood count had returned to normal (haemoglobin 13.6, WCC 9.5[4.69], platelets 314). In the context of unexplained persistent neutrophilia, Cushing's syndrome needs exclusion.

(P9): Delivering preventative diabetic ketoacidosis (DKA) learning via an educational Internet based e-learning resource centre

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This project presents an innovative educational Internet based e-learning resource centre to teach people who have type 1 diabetes and their families and carers strategies to prevent diabetic ketoacidosis (DKA) during times of intercurrent illness. All newly diagnosed patients with type 1 diabetes in the Highlands are provided with a comprehensive education package at diagnosis; thereafter this is provided on an *ad hoc* basis with no evaluation system in place.

There is a high rate of non-attendance amongst our transition age group, a group particularly vulnerable to DKA during illness, especially within those living in more rural areas. Delivering structured education presents us with several challenges including: overcoming geographical difficulties, providing specialist personnel from our limited resources, and unwillingness amongst this client group to maintain regular contact with health professionals.

Our solution was to create an Internet centre that offered engaging e-learning resources and reference information for stakeholders, young people with diabetes, parents and carers.

By using a unique multifaceted approach we were able to configure learning content to suit the profile of the user based upon their focus of interest. The centre also offers the ability to engage in interactive quizzes as well as uniquely personalised content delivery via an individual profile. This provides us with an evaluation process. The system is based upon the Resource Description Framework (RDF) model of the resources. In our project, every young person with type 1 diabetes aged between 12 and 19 years living in the Highland area was invited to participate.

(P10): Outcome audit of diabetes management in joint community clinics in the primary care setting

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An intensive community-based training programme for GPs and practice nurses with an interest in diabetes (a pair from each of 5 practices) was undertaken with a view to improving their primary care management of diabetes. This involved a 2-day interactive training course followed by regular training in joint community clinics by a senior diabetologist and a diabetes specialist nurse.

Four months after the start of the joint community clinics, the programme's effectiveness was assessed using a specially developed questionnaire. All 10 participants responded to the questionnaire, although some questions were only answered by 9 of them. The most important initial expectations for the joint clinics were to enable participants to run their own diabetes clinics (67%) and to commence and titrate insulin (44%), and all felt that their expectations had been completely or almost completely met. Having undertaken the programme, the majority of respondents felt confident or very confident about running their own clinics (90%), initiating insulin (70%), titrating insulin doses (80%), commencing oral hypoglycaemic agents (90%), providing education to patients (100%), training other staff about diabetes management (80%), and treating-to-target for hypertension (89%), hyperlipidaemia (89%) and microalbuminuria/proteinuria (78%). However, only half felt confident or very confident about changing an insulin regimen. As a result of the programme, the respondents anticipated that their referral rates of diabetes cases to secondary care would decrease by a median of 70%.