Clinical *DIGEST 2*

Management & prevention of type 2 diabetes

Promoting exercise to reduce risk factors for diabetes

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On the individual level we know that exercise is good for you. We advise our patients who are obese, or who have impaired glucose tolerance, that exercise will help them reduce their chances of diabetes. We advise patients with diabetes that exercise will help them control their diabetes. We may even follow our own advice and do regular physical activity ourselves.

On the population level we know that we live in a sedentary society, where in general people do not do enough walking or other physical activity. I guess that many of us, though, feel that in this 'age of the car' not much can be done to increase exercise at the population level.

Well, that pessimism is countered by this fascinating paper from Oslo. The researchers realised that in the poorer multi-ethnic areas of Oslo, there was little education about the benefits of exercise and little encouragement to exercise. They devised a multi-faceted intervention to try to improve this and also had the courage and skill to evaluate the outcomes.

They provided leaflets about the benefits of exercise, organised local meetings with local publicity and offered biannual fitness tests with individual counselling. They also organised walking groups and provided group indoor activity sessions at no cost to the participants.

The authors used a pseudo-experimental cohort design to compare changes in risk factors from the intervention district and a control district with similar socio-economic status. They had a baseline investigation of 2950 people aged 30 to 67 years and a follow-up investigation of 1776 (67 % of those eligible).

They found a significant increase in self-reported physical activity in the intervention district. The proportion who increased their body mass was 14.2 % lower in the intervention district. This implies a 50 % relative risk reduction for increased body mass compared with the control district. Beneficial effects were seen in triglyceride levels, cholesterol-to-HDL cholesterol ratios, systolic blood pressure (a 3.6 mmHg drop) and, in men, a drop in glucose of 0.35 mmol/l.

They conclude that a theory driven, low-cost, population-based intervention programme can increase levels of physical activity and produce beneficial changes in risk factors for diabetes and cardiovascular disease.

Do you think we have the political and public health will to mount a similar study in the UK to demonstrate similar improvements?

Reducing risk factors for diabetes by promoting physical activity

Readability	✓✓✓✓✓
Applicability to practice	✓✓✓✓✓
WOW! factor	✓✓✓✓✓

1 Recognising that lack of physical activity is an important risk factor for type 2 diabetes, the authors of this study implemented a 3-year community-based education programme.

2 People from two low-income districts of Oslo were invited to an interview at baseline (1497 lived in the intervention district and 1453 lived in the control district). Follow-up was conducted 3 years later (67 % attended).

3 Serum cholesterol, HDL cholesterol, triglycerides and plasma glucose levels were tested. Participants also answered a questionnaire relating to physical activity.

4 In the intervention area, physical activity was publicised using leaflets, local meetings, stands and mass media. Individual counselling was offered at a biannual fitness test. Walking groups were organised and walking trails in the district were signposted.

5 Significant improvements were seen in subjects in the intervention compared with the control group for triglyceride levels ($P = 0.002$), cholesterol-to-HDL cholesterol ratio ($P = 0.007$), systolic blood pressure ($P < 0.001$) and glucose levels in men ($P = 0.03$).

6 The authors concluded that this low-cost programme resulted in many postive changes in diabetes risk for the population.

Jenum AK, Anderssen SA, Birkeland KI et al (2006) Promoting physical activity in a low-income multiethnic district: effects of a community intervention study to reduce risk factors for type 2 diabetes and cardiovascular disease. *Diabetes Care* **29**: 1605–12

International Diabetes Federation type 2 guidelines published

Readability	✓✓✓✓✓
Applicability to practice	✓✓✓✓✓
WOW! factor	✓✓✓

1 Evidence-based global guidelines for the treatment of people with type 2 diabetes have been published by the clinical guidelines task force of the International Diabetes Federation.

2 Topics covered include: screening and diagnosis, education, lifestyle management, self-monitoring, cardiovascular risk protection, eye screening, foot care and pregnancy.

3 The recommendations in the guidelines are grouped into three levels: standard, comprehensive and minimal. This will allow for implementation in all parts of the world, where available resources will differ.

4 The published paper contains the recommendations, but not the detail of the underlying evidence. This can be accessed through the website www.idf.org (accessed 06.11.2006).

IDF clinical guidelines task force (2006) Global guideline for type 2 diabetes: recommendations for standard, comprehensive, and minimal care. *Diabetic Medicine* **23**: 579–93

'*Near-patient testing of HbA$_{1c}$ alone does not lead to outcome or cost benefits.*'

BRITISH JOURNAL OF GENERAL PRACTICE

Near-patient testing for HbA$_{1c}$ does not lead to better outcomes

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓

1 The authors tested the hypothesis that near-patient testing of HbA$_{1c}$ improves glycaemic control in patients with type 2 diabetes, potentially leading to a reduction in microvascular and macrovascular complications.

2 A device for rapid measurement of HbA$_{1c}$ was tested in eight GP surgeries in Leicestershire. In this open, randomised, controlled-trial, people (n=638) received either rapid results or standard care (test conducted at laboratory, resulting in a delay in the result reaching the patient).

3 The mean age of people at recruitment was 65.7 years, and the median duration of diabetes was 4 years.

4 The proportion of patients with HbA$_{1c}$ <7% after 12 months (the principal outcome measure) was not significantly different (37% [rapid result] versus 38%; odds ratio 0.95; 95 confidence interval 0.69–1.31).

5 The cost for diabetes care was not significantly different for the two groups (£370 per patient [rapid results] vs £390).

6 The authors concluded that near-patient testing for HbA$_{1c}$ alone does not lead to outcome or cost benefits in people with type 2 diabetes. They suggest that further research is required into the use of rapid HbA$_{1c}$ testing as part of an optimal patient management model.

Khunti K, Stone MA, Burden AC et al (2006) Randomised controlled trial of near-patient testing for glycated haemoglobin in people with type 2 diabetes mellitus. *British Journal of General Practice* **56**: 511–7

'*In normotensive people with type 2 diabetes and microalbuminuria, being female was associated with a higher risk of cardiovascular disease.*'

DIABETES CARE
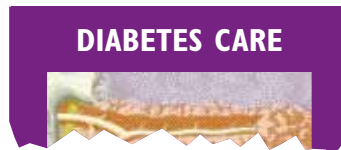
Consensus statement published on physical activity and exercise

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Readability	✓✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓✓

1 The authors state that, until recent years, high-quality evidence on the importance of exercise and fitness in diabetes was lacking.

2 This consensus document, from the American Diabetes Association, sets out to summarise recent clinical advances and provide recommendations.

3 Data are reported on physical activity and prevention of diabetes, effect of exercise on glycaemic control, frequency of exercise, and exercise in the presence of non-optimal glycaemic control.

4 Recommendations include at least 150 minutes of moderate to vigorous physical exercise each week and resistance exercise three times each week.

Sigal RJ, Kenny GP, Wasserman DH et al (2006) Physical activity/exercise and type 2 diabetes. *Diabetes Care* **29**(6): 1433–8

DIABETES CARE
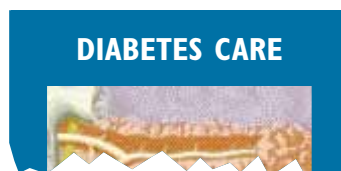
Algorithm for hyperglycaemia treatment published

Readability	✓✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓✓

1 This paper, from the American Diabetes Association and European Association for the Study of Diabetes, is a statement on managing hyperglycaemia in people with type 2 diabetes.

2 The document includes sections on glycaemic goals of therapy, principles in selecting antihyperglycaemic interventions, choosing specific diabetes interventions and initiating diabetes therapy.

3 The authors point out that despite the availability of new classes of medicines, current management has failed to achieve and maintain the glycaemic levels most likely to provide optimal care for people with type 2 diabetes.

4 The guidelines emphasise the importance of achievement of glycaemic goals, initial therapy with lifestyle interventions and metformin, rapid addition of medicines when required and early addition of insulin when necessary.

Nathan DM, Buse JB, Davidson MB et al (2006) Management of hyperglycemia in type 2 diabetes: a consensus algorithm for the initiation and adjustment of therapy. *Diabetes Care* **29**(8): 1963–72

DIABETES CARE
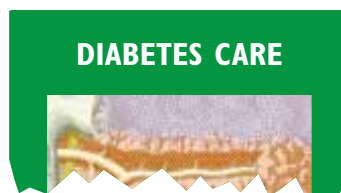
Women with microalbuminuria at higher risk of CVD

Readability	✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓

1 The excess risk of macrovascular disease and death in women was investigated in this prospective study of 67 people with type 2 diabetes.

2 The authors conclude that in normotensive people with type 2 diabetes and microalbuminuria, being female is associated with a higher risk of cardiovascular disease.

Zandbergen AA, Sijbrands EJ, Lamberts SW et al (2006) Normotensive women with type 2 diabetes and microalbuminuria are at high risk for macrovascular disease. *Diabetes Care* **29**(8): 1851–5

Type 2 diabetes

DIABETES CARE

Inhaled insulin and glibenclamide as effective as each other in adjunctive therapy

Readability	✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓

1 This study was run to compare the safety and efficacy profile of glibenclamide and inhaled human insulin when added to metformin monotherapy in people with poorly controlled type 2 diabetes.

2 People with uncontrolled diabetes currently taking metformin were randomised to either inhaled human insulin (n=243) or glibenclamide (n=233) as part of an open-label, parallel, 24-week study.

3 Inclusion criteria included a diagnosis of type 2 diabetes at least 6 months before the screening visit and an HbA_{1c} of between 8 and 12%. People entering the trial were also required to be taking 1.5 g/day or more of metformin. Patients were divided into two arms: HbA_{1c} 8–9.5% (high) and HbA_{1c} 9.5–12% (very high).

4 Differences in HbA_{1c} reductions for inhaled human insulin and glibenclamide were not significantly different across the general population (2.03% and 1.88% respectively; $P=0.058$). In the 'very high' HbA_{1c} arm, there was a significantly greater reduction in HbA_{1c} in the inhaled human insulin arm (reduction 0.37% greater in inhaled human insulin group; 95% confidence interval [CI] 0.62–0.12%; $P=0.004$). Hypoglycaemia occurred more frequently in people receiving inhaled human insulin (risk ratio 2.24; 95% CI 1.58–3.16).

5 The authors concluded that inhaled human insulin and glibenclamide are as effective as each other in improving glycaemic control in people with type 2 diabetes who are poorly controlled on metformin. Both treatments were found to be well tolerated. A subgroup of patients with HbA_{1c} greater than 9.5% were more effectively treated with inhaled human insulin.

Barnett AH, Dreyer M, Lange P et al (2006) An open, randomized, parallel-group study to compare the efficacy and safety profile of inhaled human insulin (Exubera) with glibenclamide as adjunctive therapy in patients with type 2 diabetes poorly controlled on metformin. *Diabetes Care* **29**(8): 1818–25

DIABETES CARE

Many children and adolescents with diabetes have multiple CVD risk factors

Readability	✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓✓✓

1 The purpose of this study was to determine the prevalence of risk factors for cardiovascular disease (CVD) in those under 20 years of age with diabetes.

2 This study considered data from 1083 girls and 1013 boys entered in the SEARCH study. This is a multi-centre, population-based study of people with diabetes between the ages of 0 and 19 years.

3 Research centres were based in Ohio, Colorado, Washington, South Carolina, Hawaii and Southern California.

4 CVD risk factors were defined as: HDL cholesterol <40 mg/dl (1.04 mmol/l); sex-specific waist circumference >90th percentile; systolic or diastolic blood pressure >90th percentile for age, sex or height, or taking medication for high blood pressure; and triglycerides >110 mg/dl (1.24 mmol/l).

5 The prevalence of having two CVD risk factors was 23% in girls and 19% in boys. In terms of ethnicity, prevalence was highest in American Indians (68%), followed by Asian/Pacific islanders (37%), and Hispanics (35%). At least two CVD risk factors were present in 92% of children or adolescents with type 2 diabetes.

6 Age, race/ethnicity and diabetes type were all independently associated with having at least two risk factors for CVD.

7 The authors concluded that many children and adolescents have multiple risk factors for CVD. They suggest that recommendations for weight, plasma lipids and blood pressure control are important in this group to prevent or delay the development of CVD later in life.

Rodriguez BL, Fujimoto WY, Mayer-Davis EJ et al (2006) Prevalence of cardiovascular disease risk factors in US children and adolescents with diabetes. *Diabetes Care* **29**(8): 1891–6