# Obesity

## Group-based diabetes prevention is likely to be cost-effective

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It is several years since the landmark publication of the Diabetes Prevention Program (Knowler et al, 2002) and Finnish Diabetes Prevention Study (Tuomilehto et al, 2001) and 11 years since the Da Qing study (Pan et al, 1997); yet diabetes prevention has but to come of age. It takes a long time to persuade people to change, and attitudes towards diabetes are no exception. An important question is whether or not research will translate into cost-effective, real-world diabetes prevention. Health economists have been studying whether it would be cost-effective to change our approach to diabetes from the current late management of target organ damage to primary prevention. The paper by Thomas Hoerger and colleagues (summarised to the right) addresses this question.

In a simulation analysis, the costs of screening for pre-diabetes in overweight and obese individuals; of diabetes prevention interventions; and of treating diabetes and its complications were compared with the costs of not adopting screening and intervention for pre-diabetes. The results support the idea that screening for, and treatment of, pre-diabetes is cost-effective. Therefore, this would be a worthwhile way to spend limited healthcare resources.

However, there was not a total saving because of the expense of the lifestyle intervention, even with a group-based approach. Not surprisingly, metformin was a very cost-effective preventive treatment.

The cost was also influenced by whether impaired fasting glucose (IFG) or imparied glucose tolerance (IGT) or both were adopted as criteria for intervention. Intervention on overweight individuals with both IFG and IGT was most cost-effective, partly because this restricts the numbers of individuals. Interestingly, the proportion of eligible people taking up a programme had only a small impact on costs.

However, a remaining problem is still how to undertake screening. An approach based on random capillary blood glucose tests is problematic, although cheap. Fasting plasma glucose would be better and would probably add little to overall costs. The authors acknowledge a series of major assumptions that they have had to make in constructing their models, but these are reasonable, given the lack of long-term information upon which to base assumptions. Despite these caveats this is an important piece of research that should influence public health policies for diabetes prevention.

Knowler WC, Barrett-Connor E, Fowler SE et al (2002) Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *NEJM* **346**: 393–403

Pan XR, Li GW, Hu YH et al (1997) Effects of diet and exercise in preventing NIDDM in people with impaired glucose tolerance. The Da Qing IGT and Diabetes Study. *Diabetes Care* **20**: 537–44

Tuomilehto J, Lindström J, Eriksson JG et al (2001) Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. *NEJM* **344**: 1343–50

DIABETES CARE

## Screening for pre-diabetes may be cost-effective

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

1 This US-based study was undertaken in order to ascertain whether or not screening overweight and obese people (BMI≥25 kg/m$^2$) for pre-diabetes and then modifying their lifestyle is cost-effective. Lifestyle modification was based on the DPP intervention.

2 The authors used a Markov simulation model to estimate disease progression, costs and quality of life; cost-effectiveness was evaluated from the perspective of the health care system.

3 The study cohort was created using data from the 1999–2000 NHANES and US Census population estimates from 2000. The age range was 45–74 years.

4 A one-time opportunistic screening during a scheduled visit to a physician was assumed. This would be a random capillary blood glucose test which would add approximately 10 minutes onto the consultation time and cost $32.68 per person screened, if implemented.

5 Two strategies for screening follow-up were used. The first was a lifestyle intervention if the individual had both IGT and IFG; the second was a lifestyle intervention if diagnosed with either IGT or IFG or both. These were compared with a programme of no screening.

6 Treating those with both IGT and IFG had a cost-effectiveness of $8181 per quality adjusted life year (QALY) relative to no screening. Lifestyle intervention in those with either IGT or IFG had a cost-effectiveness of $9511 per QALY.

7 This study shows that pre-diabetes screening followed by lifestyle intervention is likely to be cost-effective.

Hoerger TJ, Hicks KA, Sorensen SW et al (2007) Cost-effectiveness of screening for pre-diabetes among overweight and obese U.S. adults. *Diabetes Care* **30**: 2874–9

*'Gestational diabetes may be a modifiable risk factor for childhood obesity.'*

## DIABETES CARE

# Hyperglycaemia in pregnancy leads to childhood obesity

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

1 The authors of this study set out to determine how maternal glycaemia in pregnancy is related to the risk of obesity in childhood.

2 Screening for gestational diabetes was undertaken in two Kaiser Permanente regions – Northwest and Hawaii – between 1995 and 2000. This consisted of a 50 g glucose challenge test (GCT).

3 A diagnosis of gestational diabetes was confirmed by a 3-hour 100 g OGTT and National Diabetes Data Group criteria in 9439 women (those who had already been diagnosed with diabetes were excluded).

4 The GCT and OGTT results were used to divide the individuals into subgroups according to the level of glycaemia.

5 Weight of the offspring was measured from 5–7 years later to calculate sex-specific weight-for-age percentiles.

6 The results indicated a positive trend for increasing childhood obesity as maternal glycaemia increased ($P<0.0001$) and this was still evident following adjustment for other factors: maternal weight gain, age, parity, ethnicity and the offspring's birth weight.

7 This study suggests that hyperglycaemia in pregnancy is associated with an increased risk of childhood obesity. The investigators conclude that gestational diabetes may be a modifiable risk factor for childhood obesity.

Hillier TA, Pedula KL, Schmidt MM et al (2007) Childhood obesity and metabolic imprinting: the ongoing effects of maternal hyperglycemia. *Diabetes Care* **30**: 2287–92

*'Obese women who wish to become pregnant might consider an LAGB in order to decrease their risk of obstetric complications.'*

## INTERNATIONAL JOURNAL OF GYNECOLOGY AND OBSTETRICS

# LAGB decreases risk of obstetric complications

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

1 This retrospective case-control study was undertaken in order to evaluate the risk of adverse obstetric outcomes in obese women who underwent laparoscopic adjustable gastric banding (LAGB) before becoming pregnant.

2 The records of all women who gave birth at the Centre Hospitalier Universitaire Jean Verdier France from January 2004–October 2006 were reviewed. Those with intrauterine death and fetal loss before 22 weeks were excluded.

3 Of the 4351 women who met the inclusion criteria 427 were obese (BMI≥30 kg/m$^2$); and of these 13 had undergone LAGB before becoming pregnant.

4 The mean weight gain during pregnancy was lower in those who had undergone LAGB (mean gain of 5.5 kg) than those who had not had the procedure (mean gain of 7.1 kg; $P<0.05$).

5 Incidence of adverse obstetric outcomes (pre-eclampsia, gestational diabetes, low birth-weight, fetal macrosomia) was significantly lower in the LAGB group ($P<0.05$).

6 Delivery by Caesarean section also had a lower incidence in the LAGB group than the group who had not undergone LAGB (15.3 % versus 34.4 %; $P<0.01$).

7 The authors conclude that obese women who wish to become pregnant might consider an LAGB in order to decrease their risk of obstetric complications.

Ducarme G, Revaux A, Rodrigues A et al (2007) Obstetric outcome following laparoscopic adjustable gastric banding. *International Journal of Gynecology and Obstetrics* **98**: 244–7

## HEPATOLOGY

# Abdominal obesity predicts metabolic risk

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

1 The objective of this investigation was to define fat distribution patterns in non-alcoholic fatty liver disease (NAFLD) and examine their relationship to the metabolic syndrome.

2 Individuals seen consecutively in the NAFLD clinic between 1999 and 2001 were screened for inclusion in the study. The main criterion for inclusion was the presence of NAFLD (as proven by biopsy) within 6 months before entry to the study.

3 Total body fat and anthropometric indices were measured and fat distribution patterns were defined as: general, abdominal, limb, truncal and dorsocervical lipohypertrophy (DCL).

4 In total, 123 individuals were assessed. Of these; 81 were obese, 94 had abdominal obesity and 35 had DCL.

5 There was a significant correlation between diabetes and BMI ($P<0.05$); and between abdominal obesity (defined by waist circumference) and hypertension, hypertriglyceridaemia and insulin resistance ($P<0.05$; $P<0.001$; $P<0.0001$ respectively).

6 DCL was most strongly associated with severity of steatohepatitis.

7 These results indicate that abdominal obesity is the best predictor of metabolic risk, and that abdominal obesity and BMI added to the contribution of DCL to the severity of nonalcoholic steatohepatitis.

Cheung O, Kapoor A, Puri P et al (2007) The impact of fat distribution on the severity of nonalcoholic fatty liver disease and metabolic syndrome. *Hepatology* **46**: 1091