Identifying those at elevated diabetes risk: NICE and simple?

Naveed Sattar, Professor of Metabolic Medicine, University of Glasgow, Glasgow

Clinical trials have unequivocally established that T2D can be prevented by lifestyle measures in those at risk (Gillies et al, 2007). However, most such trials identified "at-risk" subjects using an oral glucose tolerance test (OGTT), less frequently conducted in contemporary clinical practice because of issues concerning feasibility, cost and time. The 2-hour glucose value is also subject to a high coefficient of variation (20–30%), a fact potentially contributing to its weaker demarcation of retinopathy risk in comparison with fasting plasma glucose (FPG) or HbA_{1c} cut-off points (Colagiuri et al, 2011).

These and other issues have led recent consensus and guideline committees (including Chatterton et al's [2012] summary of NICE guidance [summarised alongside; NICE, 2012]) to recommend using either fasting plasma glucose or HbA_{1c} as first-line tests to identify T2D and individuals at high risk of developing T2D. This NICE guidance is welcomed as it helps simplify clinical practice, but a number of related issues still warrant discussion.

Firstly, before recommending blood tests the NICE guidance suggests undertaking risk scoring or questionnaires to identify individuals at high risk of T2D. However, it is not well known if the average physician or nurse formally conducts risk scoring for T2D. Health professionals might be quite adept at quickly ascertaining those at elevated T2D risk based on simple demographics and questions, as well as using visual inspection so that age, gender, ethnicity, family history and adiposity are used to "intuitively" estimate risk. Of interest, a recent study by Pereira Gray et al (2012) suggests that almost two-thirds of new cases of T2D are detected before symptoms are reported, at reasonable cost by opportunistic screening in general practice and without the use of extra resources. This finding, in line with a recent report of lower retinopathy rates at diagnosis in individuals with newly diagnosed T2D (Looker et al, 2012), suggests that the lag time between actual onset of T2D and diagnosis has lessened over the years.

Secondly, we have argued before that screening for T2D (or high-risk individuals) should be conducted simultaneously with cardiovascular risk screening (Preiss et al, 2011). In this regard, both HbA_{1c} and lipid measurements can give reliable information even if individuals have not fasted – a considerable advantage towards furthering opportunistic screening.

Thirdly, it is not known what percentage of those screened will form the high-risk group for T2D (HbA_{1c} 42–47 mmol/mol [6.0–6.45%] or FPG 5.5–6.9 mmol/L). Whether the NHS can afford to implement intensive lifestyle interventions in all such individuals is also open to question. With this in mind, it is of interest to note that recent trials show commercial weight-loss companies are more successful in lowering weight in obese individuals compared with NHS care (Jebb et al, 2011).

Finally, despite there now being many supportive reports, some researchers continue to argue (and publish) that the OGTT identifies different people from HbA_{1c} and should remain the gold standard diagnostic test. However, we recently discredited such arguments, instead arguing that it is time to move the debate forward and address questions of clinical relevance (Sattar and Preiss, 2012). In this regard, the NICE guidance on identifying high-risk individuals is a helpful move in the right direction.

Colagiuri S, Lee CM, Wong TY et al (2011) Glycaemic thresholds for diabetes-specific retinopathy: Implications for diagnostic criteria for diabetes. *Diabetes Care* **34**: 145–50. Erratum in *Diabetes Care* **34**: 1888

Gillies CL, Abrams KR, Lambert PC et al (2007) Pharmacological and lifestyle interventions to prevent or delay type 2 diabetes in people with impaired glucose tolerance: Systematic review and meta-analysis. *BMJ* **334**: 299

Jebb SA, Ahern AL, Olson AD et al (2011) Primary care referral to a commercial provider for weight loss treatment versus standard care: A randomised controlled trial. *Lancet* **378**: 1485–92

Looker HC, Nyangoma SO, Cromie D et al (2012) Diabetic retinopathy at diagnosis of type 2 diabetes in Scotland. *Diabetologia* **55**: 2335–42

NICE (2012) *Preventing type 2 Diabetes: Risk Identification and Interventions for Individuals at High Risk.* Available at: http://guidance.nice.org.uk/PH38 (accessed 12.11.12)

Pereira Gray DJ, Evans PH, Wright C et al (2012) The cost of diagnosing type 2 diabetes mellitus by clinical opportunistic screening in general practice. *Diabet Med* **29**: 863–8

Preiss D, Khunti K, Sattar N (2011) Combined cardiovascular and diabetes risk assessment in primary care. *Diabet Med* **28**: 19–22

Sattar N, Preiss D (2012) HbA_{1c} in type 2 diabetes diagnostic criteria: Addressing the right questions to move the field forwards. *Diabetologia* **55**: 1564–7

BRITISH MEDICAL JOURNAL

Summary of NICE guidelines on identification and prevention of T2D

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

1 On behalf of the Programme Development Group, the authors summarise the recommendations from the NICE on the prevention, identification and management of T2D in high-risk adults.

2 NICE recommendations are based on best available evidence with consideration of cost-effectiveness; where there is limited evidence, recommendations are based on expert testimony and the Programme Development Group's informed opinion.

3 Recommendations include healthcare professionals using a risk assessment tool to identify people at high risk of T2D from data routinely available from individuals' electronic records; they should then offer venous blood tests (fasting plasma glucose or HbA_{1c}) to those identified as "high risk" for T2D.

4 Interventions for people should be tailored to their level of T2D risk; people at high risk should be offered intensive lifestyle change programmes comprising physical activity and dietary advice to attain a healthy weight, behavioural change techniques and ongoing supportive education.

5 The report highlights how to assess risk and deliver lifestyle programmes to vulnerable and hard-to-reach groups. It states that metformin or orlistat can be offered to support lifestyle change for individuals at high risk of T2D.

6 NICE recommend that diabetes risk identification and prevention should be cost-effective.

Chatterton H, Younger T, Fischer A et al (2012) Risk identification and interventions to prevent type 2 diabetes in adults at high risk: Summary of NICE guidance . *BMJ* **345**: e4624

DIABETOLOGIA

Alcohol consumption and better insulin sensitivity in women?

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

1 Epidemiological studies have shown that moderate alcohol consumption is associated with a reduced risk of T2D, although the underlying mechanisms remain poorly understood.

2 The authors investigated the relationship between moderate alcohol intake and both insulin sensitivity and insulin secretion in 1276 healthy adults participating in the RISC (Relationship between Insulin Sensitivity and Cardiovascular disease) study.

3 All participants had a euglycaemic–hyperinsulinaemic clamp and an oral glucose tolerance test. Linear regression assessed the relationship between alcohol intake categories and insulin sensitivity, secretion and clearance, and glucagon adjusted for age, recruitment centre, physical activity (PA), smoking and waist circumference.

4 After controlling for age, centre, waist circumference, smoking and PA, alcohol consumption was positively associated with insulin sensitivity in women (beta=0.15, P_{trend}=0.005) and in men (beta=0.07, P_{trend}=0.07).

5 In women, after adjustment for adiponectin, this association persisted but was attenuated after controlling for HDL-cholesterol. Higher alcohol consumption was associated with lower basal insulin secretion in women only (beta= –0.10, P_{trend}=0.004).

6 The authors concluded that light-to-moderate alcohol consumption was associated with an enhanced peripheral insulin sensitivity, a reduced basal insulin secretion and a lower fasting glucagon concentration in healthy women.

Bonnet F, Disse E, Laville M et al (2012) Moderate alcohol consumption is associated with improved insulin sensitivity, reduced basal insulin secretion rate and lower fasting glucagon concentration in healthy women. *Diabetologia* **55**: 3228–37

BRITISH MEDICAL JOURNAL

Low BP associated with increased all-cause mortality

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

1 In a retrospective study, the authors sought to determine the association between blood pressure (BP) and the risk of all-cause mortality in 126 092 adults with newly diagnosed T2D. Of the participants, 12 379 had known cardiovascular disease (CVD) prior to diagnosis of diabetes.

2 During a median follow-up of 3.5 years, 25 495 (20.2%) deaths were recorded (3535 [28.6%] of those with CVD and 21 960 [19.3%] of those without).

3 Tight control of BP <130/80 mmHg was not associated with improved survival in people newly diagnosed with T2D, with or without CVD; further, a BP <110/75 mmHg was linked with an increased mortality risk.

Vamos EP, Harris M, Millett C et al (2012) Association of systolic and diastolic blood pressure and all-cause mortality in people with newly diagnosed type 2 diabetes. *BMJ* **345**: e5567

DIABETES CARE

Novel risk factors do not greatly improve prediction of T2D

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

1 A number of potential new risk factors for T2D have been identified over the last 10 years. The study authors set out to determine whether these novel risk factors could improve T2D prediction.

2 Participants were selected from the Atherosclerosis Risk in Communities (ARIC) study. A total of 35 novel risk factors were measured in the full cohort or a sub-sample.

3 During a mean follow-up of >7.6 years, 1457 incident cases of T2D were reported among 12 277 "at-risk" study participants.

4 The area under the curve (AUC), net reclassification index (NRI) and integrated discrimination index (IDI) were calculated for each risk factor to determine if they improved risk prediction.

5 None of the novel risk factors significantly improved the AUC, only one risk factor resulted in a significant NRI, and although 14 risk factors did significantly improve the IDI, the net changes were small.

6 The novel risk factors gave only small improvements in T2D risk prediction.

Raynor LA, Pankow JS, Duncan BB et al (2012) Novel risk factors and the prediction of type 2 diabetes in the Atherosclerosis Risk in Communities (ARIC) study. *Diabetes Care* 28 Aug [Epub ahead of print]

DIABETES CARE

Genetic risk counselling does not improve diabetes prevention behaviour

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

1 The study objective was to test the hypothesis that personalised diabetes genetic risk testing and counselling can motivate behaviour to improve diabetes prevention in 108 overweight people at increased risk for T2D.

2 Diabetes genetic risk was calculated from 36 successfully genotyped risk alleles for T2D. Individuals in the top and bottom score quartiles received individual genetic counselling before enrolling alongside untested control participants in a 12-week, validated, diabetes prevention programme.

3 In total, 42 participants were at higher diabetes genetic risk, 32 were at lower diabetes genetic risk and 34 were untested control subjects. There were few significant between-group differences in self-reported motivation, programme attendance or weight loss.

Grant RW, O'Brien KE, Waxler JL et al (2012) Personalised genetic risk counselling to motivate diabetes prevention. *Diabetes Care* 28 Aug [Epub ahead of print]

"Tight control of BP <130/80 mmHg was not associated with improved survival in people newly diagnosed with T2D, with or without CVD; further, a BP <110/75 mmHg was linked with an increased mortality risk."