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Title **Screening for Type 2 Diabetes: Literature Review and Economic Modeling**

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Aim

To reconsider the case for screening for undiagnosed type 2 diabetes, eg, by reviewing choice of screening test, examining the cost effectiveness of screening, and considering higher risk groups at which screening might be targeted.

Conclusions and results

The case for screening for undiagnosed type 2 diabetes does not meet all the criteria of the UK National Screening Committee (NSC), but the case is somewhat stronger than it was at the last review, because of more options for reducing cardiovascular disease, principally through the use of statins, and because of the rising prevalence of overweight and hence type 2 diabetes.

Detecting lesser degrees of glucose intolerance such as impaired glucose tolerance (IGT) is worthwhile, partly because the risk of cardiovascular disease (CVD) can be reduced by treatment to reduce cholesterol levels and blood pressure, and because some diabetes can be prevented. Several trials show that lifestyle measures and pharmacological treatment can reduce the proportion of people with IGT who would otherwise develop diabetes. Screening could be two-stage, starting with the selection of people at higher risk. The second-stage choice of test for blood glucose remains a problem. The best test is the oral glucose tolerance test (OGTT), but it is expensive, inconvenient, and has weak reproducibility. Fasting plasma glucose would miss people with IGT. Glycated hemoglobin does not require fasting, and may be the best compromise. More people might be tested and diagnosed by using the more convenient test, rather than the OGTT. Five economic studies assessed the costs and short-term outcomes of different screening tests, but did not show which test would be best. The choice of cut-off would be a compromise between sensitivity and specificity. Modeling suggests that diabetes screening is cost effective for the 40 to 70 year age band, more so for the older age bands. But even in the group aged 40 through 49 years, the ICER for screening versus no screening is only GBP 10 216 per QALY. Screening is more cost effective for people in the hypertensive and obese subgroups. Although the prevalence of diabetes increases with age, the relative risk of CVD falls, reducing the benefits of screening. Screening for diabetes meets most of the NSC criteria, but fails on three. The issue here is whether all methods of improving lifestyles to reduce obesity and increase exercise have been sufficiently tried. The rise in overweight and obesity suggests that health promotion interventions have not so far been effective.

Methods

See Executive Summary link above.

Further research/reviews required

A key uncertainty concerns the duration of undiagnosed diabetes, and whether the rise in blood glucose levels is linear throughout, or whether a slower initial phase may be followed by acceleration around the time of clinical diagnosis. This has implications for the screening interval. Another uncertainty is the natural history of IGT and what determines progression to diabetes. Other research needs include;

- ways to reduce the prevalence of insulin resistance. What forms and amounts of exercise are required to prevent or reduce insulin resistance?
- How can public health campaigns on lifestyle be more effective? Most cases of type 2 diabetes are preventable. What balance should be struck between the public health, prevention by lifestyle approach, and the more medical model of care focused on the individual?
- If screening were to be introduced, should it be repeated, and, if so, at what interval?

A randomized controlled trial of the type required by NSC criterion 13 is under way, but will not report for about 5 years.

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