Maximizing efficiency and cost-effectiveness of type 2 diabetes screening: the AusDiab study
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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
This study assessed the most cost-effective strategy to identify people at a high risk of incident diabetes and those with prevalent undiagnosed diabetes. The authors concluded that initial screening using a self-assessed diabetes risk score, with a fasting plasma glucose test for those at high risk, and then risk reassessment, maximised the efficient identification of these people. A valid database and reliable methods were used, which makes the authors' conclusions robust.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study used data from a published longitudinal study to assess the most cost-effective screening strategy to identify people at a high risk of incident diabetes or with prevalent undiagnosed diabetes. The screening strategies used a non-invasive diabetes risk tool and a fasting plasma glucose (FPG) test.

Interventions
Four strategies were considered. Three strategies determined those at high risk, using the Australian Type 2 Diabetes Risk Assessment Tool (AUSDRISK1), and those at high risk underwent the FPG test. The fourth strategy was to test everyone using the FPG test. Treatment was a lifestyle intervention.

In the first strategy patients with a FPG of less than 7.0 millimoles per litre (mmol/L) were treated. In the second strategy, those with an FPG of 5.5mmol/L to 6.9mmol/L were treated. In the third strategy, a modified version of the AUSDRISK1 (the AUSDRISK2) was used after the FPG test to reassess high risk, and those with a FPG of less than 7.0mmol/L were treated. In the fourth strategy, those with a FPG of 5.5mmol/L to 6.9mmol/L were treated.

Location/setting
Australia/primary care.

Methods
Analytical approach:
The economic evaluation was based on an analytic model, with a short time horizon. The authors stated that the analysis was carried out from the perspective of the Australian Commonwealth Government.

Effectiveness data:
The clinical data were from the published Australian Diabetes, Obesity and Lifestyle (AusDiab) study. This was a national, population-based survey of 11,247 adults aged over 25 years, who were followed-up for five years. A final sample of 5,814 people (2,645 men and 3,169 women) was analysed for this study. The sensitivity and specificity of the screening strategies were key inputs for the analysis and these were from the AusDiab study. The efficacy of the lifestyle intervention was from clinical trials and was reduced to account for a potential lower impact in a real-life setting.

Monetary benefit and utility valuations:
Measure of benefit:
The summary benefit measure was the cases of incident diabetes or prevalent undiagnosed diabetes that were identified.

Cost data:
The economic analysis included the costs of a standard consultation, the FPG test, and six sessions of the diabetes lifestyle intervention. The costs were based on the fees paid by the Australian Government. The AusDiab study supplied most of the patterns of resource consumption. All costs were in Australian dollars (AUD) and the price year was 2009.

Analysis of uncertainty:
Bootstrapping was used to derive confidence intervals for the health and economic outcomes. Univariate sensitivity analyses were conducted on selected inputs, using published ranges of values. Alternative scenarios were considered. For example, it was assumed that 50% of people with a fasting plasma glucose of 7.0mmol/L or higher at baseline also underwent treatment in the first strategy, or it was assumed that the AUSDRISK1 was used opportunistically during a general practitioner visit for another reason.

Results
The cases of prevalent or incidence diabetes that were identified were 212 for high-risk people with a FPG of less than 7mmol/L, 297 for these patients plus 50% of those over 7mmol/L, 331 for those with a FPG between 5.5 and 6.9mmol/L, 339 using the AUSDRISK2 and FPG under 7mmol/L, and 331 without the AUSDRISK1 and FPG between 5.5 and 6.9mmol/L.

Using the AUSDRISK2 had the highest sensitivity (80.3%) and the highest positive predictive value.

The screening cost per case of prevalent or incident diabetes identified was AUD 1,130 for high-risk under 7mmol/L (AUD 930 for these plus 50% of other high-risk), AUD 1,080 for high-risk 5.5 to 6.9mmol/L, AUD 1,050 for AUSDRISK2, and AUD 1,350 without the AUSDRISK1.

For all the assumptions for the percentage of diabetes cases prevented or reverted, the intervention cost and the combined screening and intervention cost per case of diabetes prevented or reverted were lowest for the AUSDRISK2 strategy. The ranking of the strategies was unchanged with alternative assumptions.

Authors' conclusions
The authors concluded that initial screening using a self-assessed diabetes risk score, with a FPG test for those at high risk, and then risk reassessment, maximised the efficient identification of people with undiagnosed type 2 diabetes and those at a high risk of developing diabetes.

CRD commentary
Interventions:
The four strategies appear to have been appropriate. They included the available screening options for undiagnosed type 2 diabetes in the general population. A clear and extensive description of each strategy was presented.

Effectiveness/benefits:
The clinical inputs were from a large Australian database, which reflected the authors’ context and provided reliable data. The authors acknowledged that no power calculations were carried out and selection bias could not be ruled out, as there was only a 61% response rate. Conservative assumptions were made for the effectiveness of the lifestyle intervention, to include potential lower compliance and impact in the real world. The clinical inputs were varied in the sensitivity analysis. The benefit measure was specific to diabetes screening and cannot be compared with those of other disease interventions.

Costs:
The economic analysis was restricted to the costs of the implementation of screening and the lifestyle intervention. The unit costs and resource quantities were reported for some items, but a full breakdown of costs was not given. The data
sources were consistent with the perspective adopted. The impact of variations in the cost estimates was not tested in the sensitivity analyses. The price year was reported, which will allow reflation exercises for other time periods. The authors stated that the inclusion of the long-term costs of diabetes treatment would not have altered their conclusions.

Analysis and results:
The results were extensively presented for a variety of scenarios, but the total costs for each strategy were not reported. Average cost-effectiveness ratios were reported and an incremental analysis was not conducted. The uncertainty was appropriately investigated, using a bootstrapping approach, for both health and economic outcomes and alternative scenarios were analysed. The authors stated that were other possible combinations of diabetes risk scores and measures of glycaemia that they did not consider. They modelled one-off screening, but if it was repeated at intervals, the number of cases identified and the balance of incident and prevalent cases would be altered in subsequent screening rounds, affecting the costs and possibly the ranking of strategies. They stated that their results were specific to Australia and were not transferable to other settings.

Concluding remarks:
A valid database and reliable methods were used, which makes the authors’ conclusions robust.

Funding
Support received from many pharmaceutical companies, charities, and Australian Government agencies, such as the National Health and Medical Research Council.

Bibliographic details

PubMedID
21392062

DOI
10.1111/j.1464-5491.2010.03188.x

Original Paper URL

Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Australia /epidemiology; Cost-Benefit Analysis; Diabetes Mellitus, Type 2 /diagnosis /economics /epidemiology; Female; Humans; Male; Mass Screening; Prevalence; Risk Factors; Sensitivity and Specificity

AccessionNumber
22011001223

Date bibliographic record published
24/08/2011

Date abstract record published
26/01/2012