Cost effectiveness of self monitoring of blood glucose in patients with non-insulin treated
type 2 diabetes: economic evaluation of data from the DiGEM trial

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 cost-effectiveness of self-monitoring of blood glucose with or without training to incorporate the results into self-care, in addition to standardised usual care for type 2 diabetes patients. The authors concluded that self-monitoring was not cost-effective. Both the quality of the methodology and the reporting of the results and methods were good. Based on the scope of the analysis, the authors’ conclusions appear to be appropriate.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to assess the cost-effectiveness of self-monitoring of blood glucose with or without training to use the results to change the care regime, in addition to the standard care for patients with non-insulin treated type 2 diabetes.

Interventions
The authors investigated three interventions which were standardised usual care, less intensive self-monitoring, and more intensive self-monitoring. The less intensive monitoring was the use of a blood glucose meter and contact with the doctor to interpret the results. The more intensive monitoring was the use of a blood glucose meter and training to interpret and apply the results to diet, physical activity, and drug adherence.

Location/setting
UK/primary care.

Methods
Analytical approach:
This economic evaluation was based on a single clinical study the Diabetes Glycaemic Education and Monitoring trial (DiGEM). The time horizon of the study was one year. The authors stated that the perspective adopted was that of the health care purchaser.

Effectiveness data:
The effectiveness data were derived from DiGEM, which was an open, randomised, three arm, parallel group study of 453 patients, with non-insulin treated type 2 diabetes, recruited from 48 UK general practices. The patients were followed-up for one year. Further details for DiGEM were reported in another publication (Farmer et al. 2007, see 'Other Publications of Related Interest' below for bibliographic details). The main clinical effectiveness estimate was the difference in haemoglobin A1c between baseline and one year measurements.

Monetary benefit and utility valuations:
Quality of life data was collected using the EuroQol-5D (EQ-5D) at baseline and at one year. The utility values were derived from the EQ-5D responses using published UK tariffs.

Measure of benefit:
The measure of benefit was quality-adjusted life-years (QALYs) gained.
Cost data:
The direct costs to the health care purchaser were intervention costs, drug costs, primary care visits for both doctor and nurse, emergency department visits, outpatient visits, inpatient care, auxiliary health care visits, and private health care. The resource use data were collected, for both the 12 months before and after baseline, by means of the patients’ blood glucose monitoring diaries, notes compiled by nurses, and specific health service use questionnaires, which were supplemented, when necessary, by information derived from patients’ medical records. The unit costs were derived from the British National Formulary, Department of Health statistics and UK published reports. Average costs were estimated in each arm of the study for the 12 months before baseline and the 12 months of follow-up. The price year was 2005 to 2006. In order to account for loss to follow-up, the mean costs were adjusted for censored data. All costs were reported in UK pounds sterling (£).

Analysis of uncertainty:
The authors performed sensitivity analyses to examine the effects of assumptions for missing data and of observed deaths on the results. The authors also extrapolated the results of their analysis over a five-year time horizon. The methods and results used in this extrapolation exercise were reported in an online appendix.

Results
The average costs of the interventions were £89 (€113, $179) for standardised usual care, £181 for less intensive self monitoring, and £173 for more intensive self monitoring. There was an additional cost per patient of £92 (95% confidence interval, CI: £80, £103) for the less intensive group, and £84 (95% CI: £73, £96) for the more intensive group.

Initially, self monitoring had a negative impact on the quality of life, with an average score of −0.027 (95% CI: −0.069, 0.015) for the less intensive group, and −0.075 (95% CI: −0.119, −0.031) for the more intensive group.

These results were robust to the sensitivity analysis.

The costs and benefits were not combined because the interventions were associated with higher costs and lower quality of life than usual care (dominated).

Authors' conclusions
The authors concluded that self monitoring of blood glucose, with or without training to incorporate the results into self care, was associated with higher costs and lower quality of life.

CRD commentary
Interventions:
The interventions under investigation were reported clearly and in detail.

Effectiveness/benefits:
The effectiveness and outcome data were derived from a single randomised controlled trial. Full details of the trial were not reported in this paper because the study was published. However, the study appears to have been well conducted and a brief summary of the trial and its main findings were given. The primary outcomes were well reported, and appropriate statistical analyses were conducted to test for significant results.

Costs:
The costs appear to reflect the perspective stated by the authors. The resource use data and unit costs were well reported and the price year was adequately reported. The level of reporting made the cost analysis extremely transparent, allowing the reader to ascertain fully which resource use and cost data were included. The results of the analyses were reported in full, and appropriate statistical analyses were conducted to test for significant results.

Analysis and results:
The authors conducted an appropriate incremental analysis and the results were fully and clearly presented. They dealt appropriately with the impact of censoring and missing data on the results, for both outcomes and costs. In addition, in a web appendix, they extrapolated the results of the analysis over a five-year time horizon. They also acknowledged and
highlighted the main limitations of their analysis.

**Concluding remarks:**
Both the quality of the methodology and the reporting of the results and methods were good. Based on the scope of the analysis, the authors’ conclusions appear to be appropriate.

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