Cost-utility of exenatide once weekly compared with insulin glargine in patients with type 2 diabetes in the UK
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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 cost-utility of exenatide once weekly, compared with insulin glargine, for patients with type 2 diabetes. The authors concluded that exenatide once weekly was cost-effective, but this depended on the price of the drug and if the benefits observed in the short-term randomised trials extended to long-term use. On the whole, the methods were well reported and appear to have been appropriate. The authors’ conclusions appear to be valid.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to assess the cost-utility of once-weekly exenatide, compared with insulin glargine, for patients with type 2 diabetes.

Interventions
A long-acting formulation of exenatide, an incretin mimetic, given by once-weekly injection, was compared with insulin glargine, a long-acting insulin preparation.

Location/setting
UK/primary care.

Methods
Analytical approach:
The analysis was based on the published and validated Centre for Outcomes Research (CORE) Diabetes Model. The time horizon was 50 years and the authors stated that the perspective was that of the UK NHS.

Effectiveness data:
The effectiveness data were from various sources. The efficacy of each treatment was from a clinical trial, comparing them, over 26 weeks. The cohort characteristics were from the same trial, while the data on diabetic complications at baseline were from National Institute for Health and Clinical Excellence (NICE) guidelines. The key clinical inputs were the efficacy of the two treatments.

Monetary benefit and utility valuations:
The utility values were from the UK Prospective Diabetes Study. Where necessary, these data were supplemented with data from published studies.

Measure of benefit:
The measures of benefit were life-years and quality-adjusted life-years (QALYs). These were discounted at an annual rate of 3.5%.

Cost data:
The economic analysis included the pharmacy costs (insulin, needles, and self-monitoring equipment) and the costs of diabetes management and complications. The pharmacy costs were from the Monthly Index of Medical Specialities (MIMS). The price of long-acting exenatide was not known, so a combination of the prices of two similar drugs was
used. Management and complication costs were from published sources. The price year was 2009 and all costs were in UK pounds sterling (£). Costs were discounted at an annual rate of 3.5%.

Analysis of uncertainty:
Non-parametric bootstrapping was used to examine the uncertainty in the model parameters. A cost-effectiveness acceptability curve was generated for various willingness-to-pay thresholds. Univariate sensitivity analyses were carried out on the key model parameters, including the time horizon, discount rate, complication costs, drug costs, and utilities.

Results
Exenatide once weekly resulted in 11.925 life-years or 8.032 QALYs; insulin glargine resulted in 11.808 life-years or 7.849 QALYs. The cost was £21,551 for exenatide once weekly and £19,616 for insulin glargine.

The incremental cost-effectiveness ratio for exenatide once weekly, compared with insulin glargine, was £16,557 per life-year gained or £10,597 per QALY gained.

The sensitivity analysis showed that this ratio increased with a shorter time horizon and it was sensitive to the price of exenatide once weekly. Exenatide once weekly was cost-effective, compared with insulin glargine, in 79.9% of iterations at a willingness-to-pay threshold of £30,000 per QALY gained.

Authors' conclusions
The authors concluded that exenatide once weekly was cost-effective, but this depended on the price of the drug and if the benefits observed in the short-term randomised trials extended to long-term use.

CRD commentary
Interventions:
The interventions appear to have been appropriate comparators and they were described.

Effectiveness/benefits:
The effectiveness data were from various sources. The method used to identify these sources was not reported, making it unclear if all the best available evidence was analysed. The effectiveness data were from a recent clinical trial, which should have been of good quality. The sources for the utility estimates were given, but the derivation of the utility values was not described and this would have been useful to assess their validity. The measures of benefit appear to have been appropriate, as they captured both morbidity and mortality of diabetic patients, and they allow comparisons with other diseases.

Costs:
The perspective was clearly stated and the cost categories appear to have reflected this NHS perspective. The sources for the costs were reported and appear to have been appropriate, but some costs were reported as annual totals or complication costs rather than for individual items, which reduces the generalisability of the study. The source for the resource use data was unclear. The costs were appropriately discounted and adjusted for inflation.

Analysis and results:
The analytic approach appears to have been appropriate; a published and validated model was used to estimate the long-term cost and outcome data for the two interventions. An incremental approach was used to combine these data, to identify the most cost-effective strategy. The impact of uncertainty was investigated in one-way and probabilistic sensitivity analyses, which should have indicated the uncertainty in the inputs and overall. The authors reported some limitations to their study, including the lack of data on the price of exenatide once weekly.

Concluding remarks:
On the whole, the methods were well reported and appear to have been appropriate. The authors' conclusions appear to be valid.

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