Cost-effectiveness of sitagliptin-based treatment regimens in European patients with type 2 diabetes and haemoglobin A1c above target on metformin monotherapy

Schwarz B, Gouveia M, Chen J, Nocea G, Jameson K, Cook J, Krishnarajah G, Alemao E, Yin D, Sintonen H

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 examined the cost-effectiveness of adding sitagliptin to treatment for patients with type 2 diabetes and haemoglobin A1c levels above the international target, while on metformin monotherapy, in various European countries. Adding sitagliptin to metformin was a cost-saving or cost-effective alternative to adding either rosiglitazone or a sulphonylurea. The study was based on a validated model and was well reported. In general, the authors’ conclusions appear to be robust.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to examine the cost-effectiveness, in various European countries, of adding sitagliptin to treatment for patients with type 2 diabetes and haemoglobin A1c (HbA1c) levels above the international target of less than 6.5%, while on metformin monotherapy.

Interventions
The strategies were sitagliptin, rosiglitazone, or a sulphonylurea. These strategies were added to metformin treatment in patients who had not reached the HbA1c goal. Two scenarios for patients experiencing intolerance or failure were also considered.

Location/setting
Austria, Finland, Portugal, Scotland, Spain, and Sweden/primary and secondary care.

Methods
Analytical approach:
The analysis was based on a published discrete event simulation model, namely the Januvia Diabetes Economic (JADE) model, with a lifetime horizon. The authors did not explicitly state the perspective used.

Effectiveness data:
The clinical data came from a selection of known, relevant studies. The JADE model was populated with data from observational or clinical trials and the details of these were reported in another paper (in the same supplement). Some of the key data on disease progression were derived from the United Kingdom Prospective Diabetes Study (UKPDS). The baseline data on patients’ profiles were derived from local studies, the key methodological details of which were reported. The data on treatment efficacy (the key model input) and safety were derived from direct or indirect comparisons in randomised controlled trials (RCTs).

Monetary benefit and utility valuations:
Most of the utility valuations were based on the UKPDS Outcomes Model, which was supplemented with data from other published sources.

Measure of benefit:
Quality-adjusted life-years (QALYs) were the summary benefit measure and were discounted using country-specific recommendations (3% in Austria and Sweden, 3.5% in Scotland, 5% in Portugal and Finland, and 6% in Spain).
Cost data:
The economic analysis considered three main cost categories: medication costs, diabetes and diabetes-related complication costs, and treatment-related side effect costs. These costs were estimated using country-specific sources and the unit costs of drugs were reported. Other costs were only presented as macro-categories. All costs were presented in Euros (EUR) and currency conversions were applied for the UK and Sweden. The costs were discounted using country-specific rates (3% in Austria and Sweden, 3.5% in Scotland, 5% in Portugal and Finland, and 6% in Spain).

Analysis of uncertainty:
A series of one-way sensitivity analyses was carried out on selected model inputs, using published ranges of values.

Results
In comparison with the addition of rosiglitazone, adding sitagliptin led to QALY gains ranging from 0.016 in Scotland to 0.063 in Portugal and incremental costs ranging from (cost-saving) –EUR 687 in Portugal to EUR 208 in Finland. Sitagliptin ranged from dominant (both less expensive and more effective) in Portugal, Sweden and Austria to an incremental cost per QALY gained of EUR 4,766 in Finland.

In comparison with the addition of a sulphonylurea, in a scenario in which patients experiencing intolerance or treatment failure received basal insulin co-administered with metformin, adding sitagliptin led to QALY gains ranging from 0.037 in Austria to 0.095 in Scotland, and incremental costs ranging from EUR 331 in Portugal to EUR 1,097 in Scotland. The incremental cost per QALY gained ranged from EUR 5,949 in Portugal to EUR 20,350 in Austria.

In comparison with the addition of a sulphonylurea, in a scenario in which patients experiencing intolerance or treatment failure received rosiglitazone co-administered with metformin, adding sitagliptin led to QALY gains ranging from 0.045 in Sweden to 0.103 in Scotland and incremental costs ranging from EUR 339 in Portugal to EUR 1,130 in Finland. The incremental cost per QALY gained ranged from EUR 6,029 in Portugal to EUR 13,655 in Austria.

The base-case findings were relatively robust to variations in several model inputs.

Authors' conclusions
The authors concluded that adding sitagliptin to metformin was a cost-saving or cost-effective alternative to adding either a sulphonylurea or rosiglitazone in patients, with type 2 diabetes, who had not attained the HbA1c goal on metformin monotherapy.

CRD commentary
Interventions:
The selection of the comparators was appropriate as the commonly used treatments were examined. Two scenarios for patients experiencing intolerance or failure were also considered.

Effectiveness/benefits:
The clinical inputs were derived from various sources. The use of country-specific estimates for the patient characteristics and epidemiological data was valid, but little information on these sources was provided. RCTs are generally considered to be a valid source of evidence for treatment efficacy and safety. Other data were taken from a typical source for diabetes studies (the UKPDS). The authors did not investigate the issue of heterogeneity due to the use of data from multiple sources. The most uncertain estimates were varied in the sensitivity analysis, which showed the limited impact of variations in them. QALYs are a valid benefit measure and they allow comparisons to be drawn with other diseases. It was acknowledged that most of the utility weights were taken from UK patients, with possible issues of transferability to the other countries.

Costs:
The economic viewpoint was not explicitly stated, but the cost categories suggest that it was that of the health care payer. Some information on the unit costs and resource quantities was given, but other costs were presented as macro-categories. In general, the data sources were not described in detail, but country-specific data were always used. The price year was not reported.
Analysis and results:
The costs and benefits were appropriately reported and were synthesised using an incremental approach, which allowed the identification of the most cost-effective strategy. The issue of uncertainty was fully investigated by means of a deterministic sensitivity analysis and a discrete event model, which took into account the heterogeneity among patients. The authors acknowledged some limitations of their analysis including the uncertainty in some model parameters and the use of UK population data for most clinical inputs.

Concluding remarks:
The study was based on a validated model and was well reported. In general, the authors' conclusions appear to be robust.

Funding
Funding received from MSD Finland Oy, and Merck & Co.

Bibliographic details

PubMedID
18435673

DOI
10.1111/j.1463-1326.2008.00886.x

Original Paper URL
http://onlinelibrary.wiley.com/journal/119420237/abstract

Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
Cost-Benefit Analysis; Diabetes Mellitus, Type 2 /drug therapy /economics; Dipeptidyl-Peptidase IV Inhibitors /administration & dosage /economics; Drug Therapy, Combination; Europe; Female; Health Care Costs; Hemoglobin A, Glycosylated /drug effects; Humans; Hypoglycemic Agents /administration & dosage /economics; Male; Metformin /economics /therapeutic use; Middle Aged; Models, Biological; Models, Economic; Pyrazines /administration & dosage /economics; Sitagliptin Phosphate; Sulfonylurea Compounds /administration & dosage /economics; Thiazolidinediones /administration & dosage /economics; Triazoles /administration & dosage /economics

AccessionNumber
22008102463