Economic evaluation of biologic therapies for the treatment of moderate to severe psoriasis
in the United States


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 aimed to determine the most cost-effective biologic treatment for patients with moderate-to-severe psoriasis. The authors concluded that the preliminary evidence suggested that the best sequence of treatments was adalimumab, etanercept, infliximab, efalizumab, and then alefacept. The methods were appropriate, but limited costs were analysed. Assuming that the effectiveness data were of good quality, the authors’ conclusions appear to be valid.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to determine the most cost-effective biologic treatment for patients with moderate-to-severe psoriasis.

Interventions
The treatments analysed were the tumour necrosis factor antagonists, adalimumab (40mg every two weeks), etanercept (25mg or 50mg twice weekly for three months, then 25mg twice weekly), and infliximab (5mg/kg at weeks zero, two, and six, then every eight weeks), and the T-cell inhibitors, alefacept (15mg weekly) and efalizumab (1mg/kg weekly).

Location/setting
USA/out-patient secondary care.

Methods
Analytical approach:
A decision model was used to synthesise the evidence from a mixed-treatment analysis of clinical trial data, to assess the costs and benefits of each treatment. The time horizon varied from 10 to 16 weeks, depending on the treatment. The authors did not explicitly report the perspective.

Effectiveness data:
The effectiveness data were from a published systematic review that combined the data in a mixed-treatment evidence synthesis (Bansback, et al. 2009, see 'Other Publications of Related Interest' below for bibliographic details). The main clinical effectiveness estimate was the Psoriasis Area and Severity Index (PASI) response rate.

Monetary benefit and utility valuations:
The utility estimates were obtained by analysing data from two trials to determine the relationship between the health utility measure of the European Quality of life (EQ-5D) questionnaire and the PASI response.

Measure of benefit:
The measure of benefit was quality-adjusted life-years (QALYs). No difference in mortality was expected between treatments and the QALYs were determined solely by examining quality of life.

Cost data:
The direct costs were those of medications and hospitalisations. Medication costs were calculated by multiplying the number of doses each patient received by the cost of each dose. The dosages were from published trials. The
hospitalisation rates were from two published studies. All costs were reported in US dollars ($).

**Analysis of uncertainty:**
The uncertainty was assessed in one-way sensitivity analyses. A probabilistic sensitivity analysis was conducted to calculate confidence intervals for the costs, QALYs, and incremental cost-effectiveness ratios.

**Results**
The average cost per patient was $11,382 with adalimumab, $18,094 with alefacept, $13,511 with efalizumab, $11,371 with etanercept, $13,021 with high-dose etanercept, and $14,681 with infliximab. The average QALYs gained were 0.113 with adalimumab, 0.055 with alefacept, 0.085 with efalizumab, 0.092 with etanercept, 0.103 with high-dose etanercept, and 0.125 with infliximab.

Compared with etanercept, adalimumab resulted in an incremental cost-utility ratio (ICUR) of $544 per QALY gained. Compared with adalimumab, infliximab had an ICUR of $293,283 per QALY. Alefacept, efalizumab, and high-dose etanercept were all more costly and less effective than adalimumab, and were therefore dominated.

The one-way sensitivity analysis found that the hospitalisation costs and the assumptions on patient weight and on wastage of drugs were influential parameters.

**Authors' conclusions**
The authors concluded that their preliminary evidence suggested that the best sequence of treatment for moderate-to-severe psoriasis was adalimumab, etanercept, infliximab, efalizumab, and then alefacept.

**CRD commentary**

**Interventions:**
The interventions were described and they appear to have included all the relevant comparators. These comparators might have been appropriate for other settings.

**Effectiveness/benefits:**
The effectiveness data were from a meta-analysis of data identified by a systematic review. Few details of the methods of this meta-analysis were given and the original report (Bansback, et al. 2009) should be consulted to assess if the best available evidence was used and if the data were appropriately combined in the mixed-treatment comparison. Little detail was given on the methods used to derive the utility values.

**Costs:**
The perspective was not explicitly reported. The authors included only the costs of medication and hospitalisation. Other relevant health care costs, such as out-patient visits or visits to primary care physicians, were not analysed. The authors did not report the price year, which will hamper any future inflationary exercises.

**Analysis and results:**
The available data appear to have been appropriately combined, but the model structure was not described and no diagram was given. The authors reported that a probabilistic sensitivity analysis was undertaken, but the methods were not reported. They stated that the main limitation to their study was that without head-to-head trials of the interventions, the efficacy of treatments was subject to considerable uncertainty.

**Concluding remarks:**
The methods were appropriate, but limited costs were included. Assuming that the effectiveness data were of good quality, the authors' conclusions appear to be valid.

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