Cost-effectiveness of biologic treatments for psoriasis based on subjective and objective efficacy measures assessed over a 12-week treatment period


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 several biologic agents for the treatment of psoriasis. The authors concluded that, under the study assumptions, infliximab and adalimumab appeared to be the most cost-effective treatments, with efalizumab and alefacept being the least cost-effective. However, the results were sensitive to variations in the assumptions. Overall, the study appears to have been based on robust methodology, which was extensively described and the authors’ conclusions appear to be valid.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to assess the cost-effectiveness of several biologic agents for the treatment of psoriasis.

Interventions
The biologic treatments were alefacept (ALE), efalizumab (EFA), etanercept (ETA), infliximab (INF), and adalimumab (ADA). Different dosages for each biologic agent were considered and each treatment was compared with placebo.

Location/setting
USA/secondary care and outpatient clinic.

Methods
Analytical approach:
This economic evaluation was based on data derived from published sources. The time horizon of the study was 12 weeks. The authors stated that the perspective of the third-party payer was adopted.

Effectiveness data:
The clinical data were derived from a systematic review of the PubMed database between 2003 and 2007. Only randomised controlled trials (RCTs) were included. The inclusion and exclusion criteria and other details of the literature review were reported. The inclusion and exclusion criteria were based on a Delphi panel in order to ensure a high quality for the studies selected. The details of patient characteristics, drug dosages and the treatment effect at 12 weeks were reported for each trial. A weighted average was calculated when clinical estimates were available from more than one study. The data were also pooled using the Mantel-Haenszel method.

Monetary benefit and utility valuations:
None.

Measure of benefit:
The summary benefit measures were the proportion of patients achieving a 75% reduction in their baseline Psoriasis Area and Severity Index score (PASI-75), and the Dermatology Life Quality Index (DLQI) minimally important difference (MID). The estimates for both measures were derived from the literature review.

Cost data:
The health services were medications, physician visits, laboratory testing, and infusions. The drug costs were obtained from average wholesale prices, while other costs came from the Medicare clinical laboratory fee schedule and the physician reimbursement schedule. Drug wastage for INF and EFA was assumed. The resources used were determined using current treatment patterns as observed in the clinical trials or using manufacturers' published guidelines. All costs were in US dollars ($) and the price year was 2006.

Analysis of uncertainty:
A deterministic sensitivity analysis was undertaken by varying the efficacy of treatments and cost estimates. The treatment effect was varied on the basis of the available clinical trials, while other data were varied across ranges of plausible values, which were based on the authors' experience and on published sources. Additionally, an analysis of extreme scenarios was also performed, in which all variables were simultaneously set to determine the most optimistic or pessimistic value from the point of view of the intervention.

Results
The costs and benefits were clearly reported for all treatments. In comparison with placebo, the incremental cost per patient achieving:

- DLQI MID was $2,250 and PASI-75 was $19,111, with ETA 25 mg once weekly;
- DLQI MID was $3,508 and PASI-75 was $8,797, with INF 3mg/kg intravenous (IV) (3 infusions);
- DLQI MID was $3,511 and PASI-75 was $11,657, with ADA 40mg subcutaneously (SQ) every other week (eow);
- DLQI MID was $3,599 and PASI-75 was $14,254, with ETA 25mg twice weekly;
- DLQI MID was $4,322 and PASI-75 was $10,422, with INF 5mg/kg IV (3 infusions);
- DLQI MID was $5,662 and PASI-75 was $13,243, with ADA 40mg SQ eow;
- DLQI MID was $5,562 and PASI-75 was $19,116, with EFA 1mg/kg SQ once weekly;
- DLQI MID was $6,645 and PASI-75 was $18,738, with ETA 50mg twice weekly;
- PASI-75 was $40,975 (only PASI-75), with EFA 2mg/kg SQ once weekly; and
- DLQI MID was $27,136 and PASI-75 was $74,625, with ALE 15mg intramuscularly once weekly.

Thus, ETA 25mg once weekly was the most cost-effective treatment using DLQI MID achievement as the outcome measure followed by INF 3mg/kg, while using PASI-75 achievement, INF 3mg/kg and INF 5mg/kg were the most cost-effective options followed by ADA 40mg.

The sensitivity analysis indicated that base-case findings were sensitive to variations in drug prices and DLQI efficacy. Furthermore, the analysis of extreme scenarios showed significant overlap in many agents.

Authors’ conclusions
The authors concluded that, under the study assumptions, INF and ADA appeared to be the most cost-effective treatments for patients with psoriasis. However, the results were sensitive to variations in the study assumptions. The authors noted that further clinical trials should directly compare the cost-effectiveness of biologic agents with phototherapy and systemic therapy.

CRD commentary
Interventions:
The justification for the selection of the comparators was that ALE, EFA, ETA, and INF were the four biologic treatments approved by the Food and Drug Administration, and, while ADA was not yet approved, the results of
ongoing trials indicated that it was a relevant comparator. Different dosages were considered in order to reflect real-world treatment patterns.

**Effectiveness/benefits:**
The authors provided a clear description of the method and conduct of the literature review. The quality of the sources was ensured by the strict application of inclusion and exclusion criteria to their selection. Furthermore, by only selecting RCTs the evidence was restricted to sources that are usually considered the most robust. These issues tend to enhance the validity of the analysis. The authors described the derivation of the benefit measures and their validity. Thus, they appear appropriate measures for this patient population. However, these benefits are disease-specific and do not allow cross-disease comparisons. In addition, they were measured over a short term (12 weeks).

**Costs:**
The analysis of costs was consistent with the viewpoint. A breakdown of cost items was given and the unit costs and quantities of resources used were presented separately. The price year, the sources used, and other aspects of the economic analysis were reported. The use of discounting was not required given the short time horizon of the study. The whole economic analysis was performed transparently.

**Analysis and results:**
The synthesis of costs and benefits was appropriately performed. The issue of uncertainty was addressed by means of a deterministic sensitivity analysis. Simultaneous variations of the study variables were performed in the scenario analyses, which showed the high degree of uncertainty associated with the study findings. The authors acknowledged that the short time horizon represented the most apparent limitation of the study. It was also noted that the most cost-effective dosage was 3mg/kg for INF instead of the recommended 5mg/kg, while the most cost-effective dosage for ETA was 25mg weekly instead of the recommended 50mg twice weekly followed by 50-mg weekly.

**Concluding remarks:**
Overall, the study appears to have been based on robust methodology, which was extensively described and the authors’ conclusions appear to be valid.

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