Cost-effectiveness of tacrolimus ointment vs standard treatment in patients with moderate and severe atopic dermatitis: a health-economic model simulation based on a patient survey and clinical trial data


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.

Health technology
The study compared the use of tacrolimus ointment with standard treatment using corticosteroids in patients with moderate to severe atopic dermatitis.

Type of intervention
Treatment.

Economic study type
Cost-utility analysis.

Study population
The study population comprised a hypothetical cohort of Swedish patients with moderate to severe AD.

Setting
The study setting was outpatient secondary care. The economic study was carried out in Sweden.

Dates to which data relate
The effectiveness data were derived from a study published in 2005. The resource use data were derived from a survey, for which no dates were given. The price year was 2004.

Link between effectiveness and cost data
The costing was undertaken retrospectively on a patient sample different to the one which provided the effectiveness data.

Study sample
The effectiveness data were derived from a published study (Reitamo et al. 2005, see ‘Other Publications of Related Interest’ below for bibliographic details). Consequently, the authors only provided brief details of the methods used in the effectiveness study. In the effectiveness study, 487 patients were given tacrolimus 0.1% ointment and 485 received corticosteroids.

Study design
The study was a randomised, double-blind clinical trial. Patients were followed-up for a total of 6 months. The authors did not report if there was any loss to follow-up.
Analysis of effectiveness
The primary health outcomes were the number of patients in each of the following health states:

- virtually cleared, representing 90 to 100% improvement from baseline;
- moderate, representing 30 to 89% improvement from baseline;
- severe (first line), representing less than 30% improvement from baseline or worsening of symptoms; and
- severe (second line), representing patients who did not respond to treatment and were therefore switched to a second-line therapy.

The authors provided no further details on how the analysis of effectiveness was carried out.

Effectiveness results
From the results of the clinical trial, the authors estimated time-independent 3-week transition probabilities based on the percentage of patients in each health state at different time points for patients with moderate and severe AD. These were reported in full in the paper.

Clinical conclusions
The effectiveness study concluded that tacrolimus ointment was effective in treating moderate to severe AD.

Modelling
A Markov model was developed to assess the cost-effectiveness of treatment with tacrolimus ointment. The four health states in the model were severe AD (first line), severe AD (second line), moderate AD and virtually cleared AD. The time horizon appears to have been 1 year.

Measure of benefits used in the economic analysis
The measure of benefits used was the quality-adjusted life-years (QALYs) gained. Quality of life was derived from a patient survey mailed to 248 patients. Using a visual analogue scale, patients rated their present quality of life and their quality of life in periods when they experienced their most severe symptoms.

Direct costs
The direct costs included in the economic analysis were those to the health care system. These covered the costs of tacrolimus ointment, corticosteroids, emollients, light treatment and outpatient visits. All resource use data were derived from the patient survey, which was carried out in 2005 and mailed to 248 patients. The costs of pharmaceuticals were derived from the Pharmaceutical Specialities in Sweden, while the costs of outpatient visits were derived from regional price lists. Since the costs were incurred during 1 year, discounting was not relevant, and was appropriately not performed. The price year was 2004. The study reported the average costs.

Statistical analysis of costs
The costs were treated as point estimates (i.e. the data were deterministic).

Indirect Costs
Productivity costs were not included.

Currency
Euros (EUR). Euros were converted to Swedish kroner (SEK) using the exchange rate EUR 1 = SEK 9.13.

**Sensitivity analysis**
The authors performed a limited sensitivity analysis. In this analysis, they estimated cost-effectiveness when resource use for tacrolimus ointment was derived from the randomised controlled trial (RCT) instead of the patient survey.

**Estimated benefits used in the economic analysis**
In severe AD patients, the QALYs gained during 1 year were 0.6025 for those receiving tacrolimus treatment and 0.5695 for those receiving standard treatment.

In moderate AD patients, the QALYs gained during 1 year were 0.6632 for those receiving tacrolimus treatment and 0.6209 for those receiving standard treatment.

**Cost results**
Two series of cost results were reported. One series was based on trial data and the other on a survey of clinical practice.

For the trial-based cost estimates, for severe AD patients, the average cost of 1 year of treatment was EUR 621 for tacrolimus ointment and EUR 215 for standard treatment.

For moderate AD patients, the average cost of 1 year of treatment was EUR 527 for tacrolimus ointment and EUR 177 for standard treatment.

**Synthesis of costs and benefits**
The costs and benefits were combined using an incremental cost-utility ratio (i.e. the additional cost per QALY gained when tacrolimus ointment was compared with standard treatment).

When resource use data from the trial were used, the incremental cost-utility ratio was EUR 12,304 for severe AD patients and EUR 8,269 for moderate AD patients.

When resource data from the survey were used, the incremental cost-utility ratio was EUR 3,875 for severe AD patients and EUR 2,334 for moderate AD patients.

**Authors' conclusions**
The authors concluded that the results from their model supported the hypothesis that treatment with tacrolimus ointment was a cost-effective alternative to standard treatment for Swedish patients with moderate or severe atopic dermatitis (AD).

**CRD COMMENTARY - Selection of comparators**
A justification was given for the comparator used. It represented current practice in the authors' settings. You should decide if the comparator used represents current practice in your own setting.

**Validity of estimate of measure of effectiveness**
The analysis was based on an RCT. This was appropriate for the study question as well-conducted RCTs are considered to be the 'gold' standard study design when comparing health interventions. The authors provided very few details of the effectiveness study as it had already been published in another paper. However, the RCT appears to have been conducted appropriately and the results seem to be internally valid.

**Validity of estimate of measure of benefit**
The estimation of health benefit (QALYs) was derived appropriately using a Markov model. Since the QALYs were incurred during 1 year, discounting was not relevant and was thus not performed. The derivation of utilities was adequately described.

**Validity of estimate of costs**
The analysis of the costs was performed from the perspective of the national health care system paying for the treatment. It appears that all the relevant categories of costs have been included in the analysis and that no major costs were omitted.

Two estimates of resource use were calculated: one from the trial and the other from the survey of clinical practice. The authors found that respondents of the survey (n=161) were more likely to be female and have received tacrolimus treatment than nonresponders, (n=87), which might have biased the results obtained. The survey costs were lower than the trial costs because treatment compliance was lower in clinical practice. Clinical effectiveness may also be lower in clinical practice, hence the cost-effectiveness ratio based on clinical practice costs, but trial effectiveness may be biased.

The authors performed only a limited sensitivity analysis. They adequately reported the price year and the currency conversions they carried out. However, they did not report the unit costs and the resource quantities separately, which will limit the generalisability of the results.

**Other issues**
The authors did not compare their findings with those from other studies. The generalisability to other settings was not addressed. The authors do not appear to have presented their results selectively and their conclusions reflected the scope of the analysis. The authors reported that the number of patients included in the survey was relatively small. The cost-effectiveness ratio based on trial costs would appear to be more valid.

**Implications of the study**
The authors reported that treatment with tacrolimus ointment in patients with severe or moderate AD is a cost-effective alternative to contemporary standard treatment in Sweden.

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None stated.

**Bibliographic details**

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**Other publications of related interest**
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**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Adult; Cost-Benefit Analysis; Dermatitis, Atopic /drug therapy /economics; Female; Health Care Costs; Humans; Immunosuppressive Agents /economics /therapeutic use; Male; Markov Chains; Models, Economic; Ointments; Quality-Adjusted Life Years; Sweden; Tacrolimus /economics /therapeutic use

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