Treatment of multiple sclerosis with interferon beta: an appraisal of cost-effectiveness and quality of life

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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.

Health technology
Treatment of multiple sclerosis with interferon beta.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis; cost-utility analysis.

Study population
Patients suffering from relapsing-remitting multiple sclerosis.

Setting
Hospital and community settings. The study was carried out in the UK.

Dates to which data relate
Effectiveness data were collected from studies published between 1989 and 1995 and from patient questionnaires. Resource use data were collected from patient questionnaires. Cost data were collected from studies published in 1996. The price year was not reported.

Source of effectiveness data
Effectiveness data were derived from a single study and literature review.

Link between effectiveness and cost data
The costing was undertaken on a different patient sample from that used in the effectiveness analysis. The costing was carried out prospectively on the patient sample from whom health state utilities were elicited.

Modelling
A decision analytic model was used to compare the two treatment strategies.

Outcomes assessed in the review
The review assessed multiple sclerosis natural history data, including the number of relapses and the probability of disease progression.
Study designs and other criteria for inclusion in the review
Study designs and other criteria for inclusion were not reported.

Sources searched to identify primary studies
The sources searched to identify primary studies were not stated.

Criteria used to ensure the validity of primary studies
The criteria used to ensure the validity of primary studies were not stated.

Methods used to judge relevance and validity, and for extracting data
The methods used to judge relevance, validity and extracting data were not stated.

Number of primary studies included
At least 6 primary studies were included.

Methods of combining primary studies
The method of combination of primary studies were not stated.

Investigation of differences between primary studies
There was no investigation of the differences between primary studies.

Results of the review
The results of the review were not reported.

Measure of benefits used in the economic analysis
The number of relapses avoided and the number of quality-adjusted life years (QALY) gained were used as measures of benefit. Effectiveness and benefit measures were combined through the Expanded Disability Status Scale (EDSS). Benefits were discounted at an annual rate of 6%. Utilities were measured directly for 50 patients: 26 from patients who had experienced relapse in the 6 months preceding a fixed date (the recent relapse group) and 24 who had not (the remission group). Quality of life was measured using the Multiple Sclerosis Quality Of Life 54 item scale (MSQOL) based on SF36 and EuroQol-5D. Quality of life data were converted to utilities using the EuroQol-5D instrument and utilities measured directly for the subsample. Utilities were measured using the time trade-off method. Except for employment status, the utilities subsample had similar sociodemographic and clinical characteristics compared to the whole sample. MSQOL scores were significantly different (p<0.001) for physical function, role physical, and social function scales, the change in health item, and the physical health composite. There was a highly significant trend in physical function scores, from 54.2 with an EDSS score less than 3 to 12.6 with a score above 6, (p<0.0001). There were also significant differences for social and sexual function (p<0.01) and role physical and health distress, (p=0.01). There were small but significant differences for both composite scores. 31 patients reported problems with mobility and 32 reported problems with performing usual activities. The recent relapse group had worse mobility, self care, and pain than the remission group but similar anxiety and depression levels. The recent relapse group's profile was significantly poorer in all domains during relapse than currently.

Direct costs
Direct costs were discounted at an annual rate of 6%. Quantities and costs were not reported separately. Direct costs included costs of inpatient stays (specialty, number of admissions, and duration of stay), day cases, and outpatient visits (specialty and number of visits), drugs, procedures, and tests, and appliances. The quantity/cost boundary
adopted was that of the NHS. The estimation of quantities and costs was based on actual data. Cost data were collected from hospital case notes and resource use data were collected from patient questionnaires. The Chartered Institute of Public Finance and Accountancy database provided inpatient and day case unit costs. Drug costs were taken from the British National Formulary. Procedure and test costs were from the Trust providing the patients’ specialist service. Costs for appliances and community services were taken from a previous report. The price year was not reported.

**Statistical analysis of costs**
No statistical analysis of costs was reported.

**Indirect Costs**
Indirect costs were not included.

**Currency**
UK pounds sterling (€).

**Sensitivity analysis**
One-way sensitivity analyses were conducted on effectiveness and cost estimates.

**Estimated benefits used in the economic analysis**
Interferon beta-1b reduced relapses by 1.52 per patient over 5 years and increased life expectancy by 0.054 discounted QALYs. For a five-year model incorporating progression changes, 0.13 QALYs were gained.

**Cost results**
Interferon beta-1b had discounted net costs of 43,600. For a five-year model incorporating progression changes, interferon beta-1b had a cost of 43,400.

**Synthesis of costs and benefits**
Interferon beta-1b had a cost per relapse avoided of 28,700 and a cost-utility ratio of 809.900 per QALY gained. For a five-year model incorporating progression changes, interferon beta-1b had a cost per QALY gained of 328.300. Varying effectiveness and cost estimates did not change the cost-utility ratio. The 10-year model produced similar results.

**Authors’ conclusions**
Interferon beta-1b produces important occasional short term quality of life gains, but small gains in QALYs overall and large additional costs.

**CRD COMMENTARY - Selection of comparators**
A justification was given for the comparator used, namely a newly available treatment. You, as a user of the database, should decide if this health technology is relevant to your setting.

**Validity of estimate of measure of benefit**
The analysis was partially based on a cohort study, which was appropriate for the study question. The patient sample was representative of the study population. Patient groups were shown to be comparable. The authors did not state that a systematic review of the literature had been undertaken. More details about the design, conduct, and results of the review could have been provided. The method of combining effectiveness estimates from primary studies was not
reported. Estimation of benefits was modelled. The instruments used to derive measures of benefit, EuroQol-5D and MSQOL, were appropriate.

**Validity of estimate of costs**
All relevant categories of costs relevant to the perspective adopted were included in the analysis. Quantities and costs were not reported separately. A sensitivity analysis was conducted on costs, but not on quantities. Costs were used to proxy prices. The price year was not reported.

**Other issues**
The authors did make appropriate comparisons of their findings with those from other studies. The issue of generalisability to other settings was addressed. The authors did not present their results selectively. The study enrolled patients suffering from relapsing-remitting multiple sclerosis and this was reflected in the authors’ conclusions.

**Implications of the study**
Future trials should base outcomes measurement on quality of life and be better linked to natural history and cost data.

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**Bibliographic details**

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
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