Cost effectiveness of peginterferon alfa-2b combined with ribavirin for the treatment of chronic hepatitis C in Brazil
Fonseca MC, Araujo GT, Araujo DV

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 pegylated interferon alpha-2b plus ribavirin compared with conventional (non-pegylated) interferon alpha-2b plus ribavirin, for the treatment of chronic hepatitis C. The authors concluded that pegylated interferon was a cost-effective alternative to conventional interferon, for patients with any viral genotype. The methods appear to have been valid, but more description of the data sources would have helped in judging the validity of the data. The authors’ conclusions seem robust.

Type of economic evaluation
Cost-utility analysis

Study objective
This study examined the cost-effectiveness of pegylated interferon alpha-2b plus ribavirin compared with conventional (non-pegylated) interferon plus ribavirin, for the treatment of chronic hepatitis C in patients with different viral genotypes and liver histology.

Interventions
Interferon plus ribavirin was compared against pegylated interferon plus ribavirin. The pegylated interferon-α was given subcutaneously at 1.5mg per kg once a week, with oral ribavirin 1.0 to 1.2g per day. Conventional interferon was given subcutaneously, at three million units three times a week, with oral ribavirin 1.0 to 1.2g per day. Treatments lasted for 48 weeks, for patients with genotype one, or 24 weeks for all other genotypes. They were compared with no treatment.

Location/setting
Brazil/secondary care.

Methods
Analytical approach:
The analysis was based on a Markov model, with a lifetime horizon. The authors stated that the perspective of private medicine was adopted and this included insurers, health maintenance organisations, cooperatives, and self-management organisations.

Effectiveness data:
The clinical data came from the published literature and Brazilian population statistics. Three observational studies were used to derive the transition probabilities for the natural histories of mild and moderate chronic hepatitis C. The treatment effect for pegylated interferon plus ribavirin was from a single randomised controlled trial, while the effect for interferon plus ribavirin was from other studies. Mortality was based on Brazilian life tables. The key endpoint was the rate of sustained viral response, which was defined as the absence of serum hepatitis C virus ribonucleic acid at the end of treatment and six months later.

Monetary benefit and utility valuations:
The utility values for each health state were from two published studies and were assumed to be the same for the two treatment arms. In these two studies, the utilities were established by a panel of hepatologists.

Measure of benefit:
Quality-adjusted life-years (QALYs) were the summary benefit measure and were discounted at an annual rate of 3%.

Cost data:
The economic analysis included the costs of the two drug regimens and the long-term treatment of chronic hepatitis C, which was micro-costed by modified Delphi panels of six hepatologists, six oncologists, and six intensive care physicians. The unit costs were based on public prices for all items. The costs were presented as category totals for health conditions. They were in Brazilian reais (BRL) and were discounted at a rate of 3% per annum. The price year was 2006.

Analysis of uncertainty:
One- and two-way sensitivity analyses were carried out on most of the clinical and economic inputs, using plausible published ranges of values. A Monte Carlo simulation was carried out.

Results
In the whole cohort, the total lifetime costs were BRL 59,782.93 with pegylated interferon and BRL 44,334.25 with interferon. The QALYs were 3.39 with pegylated interferon and 2.61 with interferon. The increase in QALYs with pegylated interferon was 0.78 for patients of genotype one, and 0.44 for all other patients.

Compared with no treatment, the incremental cost per QALY gained was BRL 6,087.20 with pegylated interferon and BRL 1,987.33 with interferon. The incremental cost per QALY gained with pegylated interferon over interferon was BRL 19,848.34, which was cost-effective according to the World Health Organization (WHO) threshold of three times the per capita gross domestic product in Brazil (BRL 37,493.00) and it remained below this figure in all sensitivity analyses, even unfavourable ones.

The Monte Carlo simulation indicated that, at a threshold of BRL 37,493.00 per QALY, compared with interferon, there was a probability of 90% that pegylated interferon was cost-effective, for patients of genotype one and 95% for all other patients.

Authors' conclusions
The authors concluded that pegylated interferon was a cost-effective alternative to conventional interferon, for patients with any viral genotype.

CRD commentary
Interventions:
The comparators were appropriately selected. The authors stated that, since 1998, interferon plus ribavirin was considered to be the gold standard treatment for chronic hepatitis C in Brazil. Pegylated interferon was developed to improve the efficacy and safety profiles of interferon.

Effectiveness/benefits:
No systematic review was reported for identifying the relevant sources of data and their methods and the characteristics of the patient samples were not reported. This limits the possibility of making an objective assessment of the validity of the clinical data. Some data, such as mortality estimates, were appropriately from national statistics. The treatment effect for pegylated interferon was from one randomised controlled trial, but no further details were given. QALYs were an appropriate and valid benefit measure given the impact of the disease on survival and quality of life. They allow cross-disease comparisons to be made. Life-years were also reported. The utility estimates were based on published expert opinions because patient-based preferences were not available.

Costs:
The data on the management of disease and the resource use for treating chronic hepatitis C were from three Delphi panels, probably due to a lack of reliable published estimates. This might have been appropriate, but the results were not clearly described. A breakdown of cost items was not given and the data were presented as totals for each category of costs. This limits the transparency and external validity of the economic analysis. The price year and the use of discounting were appropriately reported, as was a currency conversion to US dollars.
Analysis and results:
The results were extensively presented for the whole population and for subgroups of patients classified by their chronic hepatitis C genotype. Extensive sensitivity analyses were carried out on the model inputs and the findings were clearly presented and discussed. The authors stated that their findings were validated, using published data on the natural disease evolution of chronic hepatitis C. The key details of the structure and assumptions of the model were reported.

Concluding remarks:
The methods appear to have been valid, but more description of the data sources would have helped in judging the validity of the data. The authors’ conclusions seem robust.

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