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 evaluated the cost-effectiveness of bazedoxifene, compared with raloxifene, for the prevention of fractures in postmenopausal women with osteoporosis and a high risk of fracture. The authors concluded that bazedoxifene was cost-effective, compared with raloxifene. The study was based on a large trial and used a published model, but the assumptions of no drop-outs and perfect adherence add to the considerable uncertainty over the most cost-effective treatment. Relevant comparators were not included.

Type of economic evaluation
Cost-utility analysis

Study objective
This study evaluated the cost-effectiveness of bazedoxifene, compared with raloxifene, for the prevention of fractures in postmenopausal women with osteoporosis and a high risk of fracture.

Interventions
Two selective oestrogen receptor modulators, 20mg of bazedoxifene or 60mg of raloxifene, were compared.

Location/setting
Spain/secondary care.

Methods
Analytical approach:
A published six-state Markov model was adapted for Spain (see Other Publications of Related Interest). The time horizon was 27 years. The perspective was that of the Spanish National Health Service.

Effectiveness data:
The relative risk of fracture, with each drug, was the primary measure of efficacy. This was derived using data from a large head-to-head randomised controlled trial (the Osteoporosis Study) of bazedoxifene and raloxifene. The age-standardised fracture incidence, from Spanish publications, was used for the initial fracture risk. The validated FRAX tool was used to quantify the fracture risk from the trial. The age at which women started in the model was the lowest age of participants in the trial, which was 55 years (the highest age was 82 years).

Monetary benefit and utility valuations:
The utility weights were from a large global longitudinal study on health-related quality of life in postmenopausal osteoporotic women, aged 55 years or older, who had sustained fractures. The values were elicited using the EQ-5D and Short-Form (SF-36) sub-scales, mapped to a country-specific preference-based value. Reductions in quality of life, due to adverse events, were based on publications and authors’ assumptions.

Measure of benefit:
The primary measure of benefit was quality-adjusted life-years (QALYs). Benefits were discounted at 3% annually.

Cost data:
The costs included treatment, fracture events, and adverse events. Treatment for osteoporosis included drugs,
and follow-up tests, and physician visits. Drug costs were from the Spanish drug cost database; bazedoxifene was assumed to have the same cost as raloxifene. The resources for fractures were assumed, based on expert opinion, and included hospitalisation, imaging procedures, specialist visits and concomitant medication. Adverse event costs were estimated from their trial incidence and expert opinion. Most of the costs were from the Spanish government. They were reported in 2010 Euros (EUR) and discounted at 3% annually.

Analysis of uncertainty:
The stability of the results to parameter variations was assessed using probabilistic sensitivity analysis. This used 1,000 simulations, with gamma distributions for the costs and beta distributions for the probabilities.

Results
In the deterministic analysis, the total costs for bazedoxifene were EUR 13,436, which was EUR 444 less than raloxifene. The total QALYs gained with bazedoxifene were 14.56, which was 0.02 more than raloxifene. This combination of lower costs and higher benefits indicated that bazedoxifene was dominant.

The probabilistic sensitivity analysis found that bazedoxifene was more likely to be cost-effective than raloxifene at all values of willingness-to-pay for a QALY. Its likelihood of cost-effectiveness was approximately 52% at values of willingness-to-pay between EUR 10,000 and EUR 50,000 per QALY.

Authors' conclusions
The authors concluded that bazedoxifene was cost-effective, compared with raloxifene.

CRD commentary
Interventions:
It appears that not all those interventions appropriate to the trial population were included. Alendronate, risedronate, strontium ranelate, teriparatide, and denosumab, as well as no treatment, were omitted. These drugs were recommended by the National Institute for Health and Care Excellence (NICE) for the prevention of osteoporotic fractures in postmenopausal women in the UK.

Effectiveness/benefits:
The effectiveness evidence was from a large randomised controlled trial that appeared to be of high quality. The trial excluded patients with many conditions and co-morbidities that could be common in the users of both drugs. Omitting comparators could have been very misleading; it would have been better to conduct a mixed-treatment comparison of all relevant comparators. It was unclear which instrument was used to measure utility. The authors stated that EQ-5D and SF-36 sub-scales were mapped to a country-specific value; the instrument was not specified. Adverse events were assumed to reduce quality of life by 10%; no justification for this assumption was given, and it was unclear how long the reduction lasted. Quality of life did not appear to be age-adjusted. The time horizon of 27 years matched the age range in the trial, which was not necessarily the best way to select a time horizon.

Costs:
The costs appear to have been from appropriate Spanish sources. Most of the resource use was assumed by experts, rather than using data from the trial of over 7,000 patients; it was not clear why these data were not collected or not used. The resource use estimates do not seem to have been widely varied in the probabilistic sensitivity analysis, and no one-way sensitivity analyses were reported. The price year was clearly stated and the discounting appears to have been appropriate.

Analysis and results:
The results were clearly presented, with a clear diagram of the probabilistic sensitivity analysis. The methods and parameters in the probabilistic sensitivity analysis were not clearly presented. The distributions for the costs and probabilities were reported and were appropriate; either no other model parameters were varied or their distributions were not reported. The model assumed that patients took the drugs until they died or the model ended, with no discontinuation due to adverse events; this was not realistic. The authors acknowledged some other limitations: the model did not include breast cancer risk; and adherence was not modelled, but was expected to be poor. These limitations may have overestimated the benefits and underestimated the costs.
Concluding remarks:
The study was based on a large trial and used a published model, but the assumptions of no drop-outs and perfect adherence add to the considerable uncertainty over the most cost-effective treatment. Relevant comparators were not included.

Funding
Funded by Pfizer, the manufacturer of bazedoxifene.

Bibliographic details

DOI
10.2147/CEOR.S42755

Other publications of related interest

Indexing Status
Subject indexing assigned by CRD

MeSH
Humans; Women's Health; Female; Spinal Fractures; Osteoporosis, Postmenopausal; Spain; Quality-Adjusted Life Years; Indoles; Raloxifene Hydrochloride

AccessionNumber
22013031903

Date bibliographic record published
30/08/2013

Date abstract record published
05/08/2014