How rebates, copayments, and administration costs affect the cost-effectiveness of osteoporosis therapies
Ferko NC, Borisova N, Airia P, Grima DT, Thompson MF

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
The objective was to explore the effect of varying rebates, co-payments and delivery of drugs (oral or intravenous) on the cost-effectiveness of osteoporosis treatment, for managed care organisations. The authors concluded that the cost-effectiveness of the drugs varied considerably when these factors were considered. The conclusions are appropriate, but the cost-effectiveness of the treatments was not fully assessed.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to explore the effect of varying rebate rates, on the cost-effectiveness of risedronic and ibandronic acid, and the effect of varying co-payments and administration costs, on the cost-effectiveness of intravenous zoledronic acid and risedronic acid, for women with osteoporosis, aged 50 years or older.

Interventions
Two treatments, for each of two analyses, were selected. In the first analysis, risedronic acid was compared with ibandronic acid. These were chosen because they both had tier two status in the formulary. In the second analysis, intravenous zoledronic acid was compared with risedronic acid. Zoledronic acid was delivered once annually, and it was chosen because it had tier three status in the formulary; it had different administration costs, due to its intravenous delivery; and it had a different co-payment structure.

Location/setting
USA/out-patient.

Methods
Analytical approach:
The analysis was based on a published Markov model of the ongoing risk of fracture over time, which varied according to patient risk factors. The authors stated that the perspective of the managed care organisation was adopted.

Effectiveness data:
The inputs for age-specific fracture rates, mortality, and efficacy were those used in the published model. The key effectiveness data were the relative risk reductions in vertebral and non-vertebral fractures. These data appear to have been from five studies, which were all referenced. Other clinical data included the relative risk of death and fracture incidence by age group.

Monetary benefit and utility valuations:
The utility values for the general population, and for vertebral and non-vertebral fracture health states, were those used in the published model. Two references were provided.

Measure of benefit:
The measure of benefit was quality-adjusted life-years (QALYs) gained.

Cost data:
The costs included the drugs, hospitalisations, physician visits, and laboratory tests. The drug costs were calculated by adjusting the wholesale acquisition cost upwards for the pharmacy network discount, the dispensing fee, and the drug administration cost; and by adjusting it downwards by the co-payment or co-insurance, and the rebate discount. In the first analysis, the rebate was varied between zero and 90% of the drug costs, as these varied between managed care organisations and were not publicly available. It was assumed that there were 13 prescriptions per year. The additional administration costs for intravenous zoledronic acid (nursing time, materials and blood tests) were considered. The costs of treating fractures were from the published model. The price year was 2009. All costs were in US $.

Analysis of uncertainty:
In the second analysis, six scenarios were modelled for the costs of zoledronic acid: including or excluding the cost of intravenous administration, and varying the co-payment between tier three and tier four (with co-insurance of 20% or 30%) formulary status.

Results
In evaluating the effects of different rebate rates on the cost-effectiveness of risedronic acid, compared with ibandronic acid, the cost per QALY gained remained below $50,000 for most scenarios. With no rebate on risedronic acid, a rebate of roughly 65% was required on ibandronic acid before the incremental cost-effectiveness ratio for risedronic acid rose above $50,000 per QALY gained. When the rebate on risedronic acid was above 25%, it was cost saving, as well as more effective than ibandronic acid.

In all six scenarios, varying the administration and co-payment costs for zoledronic acid, risedronic acid remained cost saving, compared with intravenous zoledronic acid. The total annual cost of zoledronic acid varied from $1,351,000 to $1,859,000. The incremental QALYs for risedronic acid, over intravenous zoledronic acid, were 2.59 per 1,000 women.

Authors' conclusions
The authors concluded that the cost-effectiveness of the drugs varied considerably when factors other than their wholesale acquisition price were considered.

CRD commentary
Interventions:
The interventions were chosen as they were convenient for investigating the effect of varying rebate rates, and the administration and co-payment costs, on the cost-effectiveness of treatment. For decisions on the cost-effectiveness of alternative treatments for osteoporosis, all the relevant options should be included in one analysis.

Effectiveness/benefits:
The effectiveness and utility data were from the published model, and no further details were provided, so the validity of these data cannot be assessed.

Costs:
The methods for costing the drugs were described, but few details were given on the costs of fractures. These were from the published model and the validity of these costs cannot be assessed. The additional costs, for the two analyses, were well presented and appear to have been appropriate.

Analysis and results:
Two figures presenting some results for the first analysis were referred to in the text, but were not presented. The description of the effect of the different cost assumptions on the cost-effectiveness of risedronic acid versus ibandronic acid or intravenous zoledronic acid was adequate. The focus of the paper was not the cost-effectiveness of osteoporosis treatment, so insufficient details of the model structure and assumptions were provided to allow an assessment to be made. The focus was the sensitivity analysis of different cost assumptions on the cost-effectiveness outcomes; this element was well conducted and well reported.

Concluding remarks:
The authors demonstrated that the cost-effectiveness of drugs for the treatment of osteoporosis varied for different managed care organisations, depending on the rebates agreed with pharmaceutical companies, and co-payments and administration costs were significant factors. The estimates of the cost-effectiveness of the treatments are not robust,
and have not been fully assessed.

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