Cost-effectiveness of oral bisphosphonates for osteoporosis at different ages and levels of life expectancy

Pham AN, Datta SK, Weber TJ, Walter LC, Colon-Emeric CS

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 of the study was to explore the cost-effectiveness of oral bisphosphonate treatment for osteoporosis in women aged 50 to 90 with varying life expectancy. The authors concluded that treatment of women for osteoporosis with oral bisphosphonates was cost-effective regardless of life expectancy. Although a couple of issues could have been more fully reported, the authors’ conclusions appear appropriate given the evidence.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The objective of the study was to explore the cost-effectiveness of oral bisphosphonate treatment for osteoporosis in women aged 50 to 90 with varying life expectancy.

Interventions
The study compared five years of oral bisphosphonate treatment against no intervention.

Location/setting
USA/primary care.

Methods
Analytical approach:
The authors used a decision analytical model to synthesise data from a range of sources in assessing the cost-effectiveness of treatment for osteoporosis across age ranges. The time horizon of the analysis was lifetime. The authors stated that the study perspective was societal.

Effectiveness data:
The main clinical effectiveness estimates were: population risk of fracture based on results from a cohort study and a published background risk estimate; mortality after fracture; efficacy of oral bisphosphonates from published meta-analyses; and alternative scenarios of treatment adherence.

Monetary benefit and utility valuations:
Utility estimates were obtained for acute and post-fracture health states for hip, vertebral and other sites. The sources of utility data were a systematic review of utilities associated with osteoporosis and age-specific utility estimates from the published literature. Healthcare benefits were discounted at a rate of 3% per year.

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

Cost data:
The cost categories included direct costs associated with administration of bisphosphonates (drugs, physician time and x-ray absorptiometry scans) and treatment of hip fractures and indirect costs of long-term care associated with hip fracture. Drug costs were taken from the Drug Topics Red Book. Physician time and scans were taken from the Physician Fee Schedule 2009. Costs of treatment and long-term care associated with hip fractures were based on
estimates from the published literature. Costs were provided in 2008 US Dollars ($) and were discounted at a rate of 3% per year.

Analysis of uncertainty:
The authors conducted one-way sensitivity analysis to assess the impact on results of uncertainty in the key parameters and presented the result using cost-effectiveness acceptability curves.

Results
In patients with the shortest life expectancy (25 years or less) the incremental cost-effectiveness ratio for treatment of osteoporosis with oral bisphosphonates ranged from $2,407 per QALY gained for the 80-years age group to $42,275 per QALY gained for those aged 50 years when compared with no treatment.

In patients with life expectancy of 26 years or more, treatment with oral bisphosphonates was dominant (less costly and more effective) than no treatment for the 75-, 80- and 85-year-olds. For other age groups the incremental cost-effectiveness ratio was less then $30,000 per QALY gained compared with no treatment.

Treatment with oral bisphosphonates remained cost-effective at a level of willingness to pay of $50,000 per QALY gained across a range of levels from the literature for single parameters.

Authors' conclusions
The authors concluded that treatment of women for osteoporosis with oral bisphosphonates was cost-effective regardless of life expectancy.

CRD commentary
Interventions:
The intervention and comparator and duration of treatment were defined but frequency and dosage of treatment were not reported.

Effectiveness/benefits:
The methods used to identify relevant studies from the published literature were not described in detail. The authors described the principle behind selecting the parameter estimate from the identified evidence. The published papers for the evidence were referenced for the methods. The methods used to estimate utilities were not provided but the systematic review that provided these data was referenced. The clinical outcomes seemed appropriate given the decision problem.

Costs:
The authors specified the perspective of the analysis and included cost categories that were consistent with the perspective. Productivity costs should perhaps have been included as some patients were of working age. The authors provided the cost year and described the discount rate. Most of the costs appeared highly relevant to the study setting.

Analysis and results:
Incremental analysis was appropriate to explore the relative cost-effectiveness of the alternative treatment options. Estimates of the cost and effectiveness were not presented before being combined in an incremental cost-effectiveness ratio. The results of the sensitivity analysis were provided in detail. Use of a one-way sensitivity analysis was appropriate in some cases given the different parameter estimates available. Parameter uncertainty was incorporated in the model in order to derive the mean results but it was not used to describe the uncertainty in the cost-effectiveness results. It would have been useful had the authors reported incremental cost-effectiveness ratios for different age groups from previous studies to put the results into context.

Concluding remarks:
Although a couple of issues could have been reported more fully, the authors’ conclusions appear appropriate given the evidence.

Bibliographic details