Prevention of osteoporosis: a cost-effectiveness analysis regarding fractures
Norlund A

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
Bone mass screening (bone mineral density, BMD) and hormone replacement therapy (HRT) versus no intervention.

Type of intervention
Primary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
Middle aged women with low bone mass.

Setting
Hospital. The study was carried out in Malmohus, Sweden.

Dates to which data relate
For the effectiveness analysis the main outcomes were taken from a study published in 1992. 1993 prices were used.

Source of effectiveness data
Review of previously published studies.

Link between effectiveness and cost data
The costing was not undertaken on the same patient sample as that for the effectiveness analysis. The costing was calculated by the model.

Modelling
A computerized model was used in estimating costs.

Outcomes assessed in the review
The following outcomes were assessed: uptake rate, positive predictive value of the screening, incidence of fractures (hip, spine and radius), compliance rate and risk reduction rate (for hormone replacement therapy in patients with low bone mass density), forms of living before and after the fracture.

Study designs and other criteria for inclusion in the review
The designs of included studies were not specifically reported, nor was there any description of inclusion or exclusion criteria.

**Sources searched to identify primary studies**
No report of sources searched.

**Criteria used to ensure the validity of primary studies**
Not reported.

**Methods used to judge relevance and validity, and for extracting data**
No judgement criteria stated. Summary statistics were used.

**Number of primary studies included**
Seven studies were included, mainly cohort studies.

**Methods of combining primary studies**
Studies were not combined. The main statistics were used in the model in order to estimate costs.

**Investigation of differences between primary studies**
Not reported.

**Results of the review**
The following outcomes were used:

- Uptake rate, 30%;
- positive predictive value, 0.35;
- incidence of fractures, 1.1% for 50-59 year-old woman, 4.1% for 60-69 year-olds, 6.6% for 70-79 year-olds, 13.2% for 80-89 year-olds (for hip, spine and radius fractures combined);
- compliance rate, 30%;
- risk reduction, 50%.

With respect to forms of living before fractures, 63% lived at home, 16% in an old people's home, 10% at a nursing home, 4% in a geriatric care unit, and 7% in other types of accommodation. After the occurrence of fractures, the respective figures were 53%, 16%, 18%, 7% and 6%.

**Measure of benefits used in the economic analysis**
Uptake rate, positive predictive value of the screening, incidence of fractures (hip, spine and radius), compliance rate and risk reduction rate (for hormone replacement therapy in patients with low bone mass density), forms of living before and after the fracture.

**Direct costs**
Costs were discounted. Quantities were not reported. The costs measured were orthopaedic care, rehabilitation care, nursing home and other care, out of pocket pharmaceutical expenses and travel expenses. The cost boundary adopted
was societal. The estimation of costs was based on published information from other studies. The price are from 1993.

**Indirect Costs**
Costs were discounted. Quantities were reported separately. Production losses and time lost were measured. The cost boundary was patient and society. The estimation of quantities and costs was based on information previously published and on standard prices. Prices were from 1993.

**Currency**
Swedish Kroner (SEK).

**Sensitivity analysis**
A one-way, simple sensitivity analysis was performed varying the age at which treatment begins.

**Estimated benefits used in the economic analysis**
The estimated benefits were as follows:

- Uptake rate, 30%;
- Positive predictive value, 0.35;
- Incidence of fractures, 1.1% for 50-59 year-old woman, 4.1% for 60-69 year-olds, 6.6% for 70-79 year-olds, 13.2% for 80-89 year-olds (for hip, spine and radius fractures combined);
- Compliance rate, 30%;
- Risk reduction, 50%.

With respect to forms of living before fractures, 63% lived at home, 16% in an old people's home, 10% in a nursing home, 4% in a geriatric care unit, and 7% in other types of accommodation. After the occurrence of fractures the respective figures were 53%, 16%, 18%, 7% and 6%. The duration of benefits was lifetime.

**Cost results**
Using a 5% discount rate, the total cost of hip fracture was 114,000 SEK (same for Spine) whereas for radius it was 16,000 SEK. The increased costs (under treatment) totalled 12,359,000 SEK, whereas the reduced costs amounted to 8,407,000 SEK. The net increased costs were 3,952,000 SEK.

**Synthesis of costs and benefits**
No synthesis was carried out. Sensitivity analysis showed that, if the model were applied to a cohort of women aged 65-69, negative net increased costs would result, given the risk of fractures and life expectancy for women in that age group.

**Authors' conclusions**
Based on these results, the board of the University Hospital of Lund decided not to introduce bone mass screening in combination with hormone replacement therapy.

**CRD Commentary**
As the author implies, the decision on whether or not to introduce a treatment should take into account the welfare valuation of the intervention's benefits. The model used in the study was not properly described with only the clinical
and economic components being reported, with no further explanation of the character of the model. No explanation regarding cost definitions or elements of different cost categories was clearly reported. Apparently, no systematic search of the literature was conducted for the clinical/effectiveness analysis.

Source of funding
None stated.

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