

Cost-effectiveness of pulse-echo ultrasound measurement of bone mineral density as a tool for osteoporosis screening and diagnostics



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INTRODUCTION

- As we lack effective screening or diagnostic devices at primary healthcare, over 75% of osteoporotic patients are not diagnosed nor receive treatment for their pathological condition¹.
- In this study, a pocket size pulse-echo ultrasound device (Bindex[®], Bone Index Finland Ltd.) is compared to axial DXA in terms of health economic efficiency (incremental cost-effectiveness).

METHODS

- The health-economic analysis designed for Finland was done by using a new Markov model of the preventive treatment of osteoporosis-related fractures, inspired by earlier models²⁻⁴. Finnish societal perspective (productivity losses excluded) with a 10-year time horizon was used.
- Two care pathways were compared for osteoporosis (OP) treatment (Figure 1). FRAX with BMI with age dependent NOGG criteria⁵ was the initial screening tool for both pathways.
- Bindex[®] uses 90% sensitivity and specificity thresholds for OP according to the ISCD guidelines⁶ and only 32.6% of patients suspected of OP needs to undergo an additional DXA measurement to verify the OP diagnosis (see Poster 447).
- Preventative treatment was modelled as most frequently-used generic alendronate and efficacy was based on an earlier meta-analysis⁷. Compliance/persistence were modelled at 50% as in the earlier models²⁻⁴.
- The model was evaluated for five patient cohorts: women (BMI 24 kg/m²) aged 65 years with previous fracture and 75 or 85 years with and without previous fracture. Fractures included wrist, vertebral, hip and other fractures.

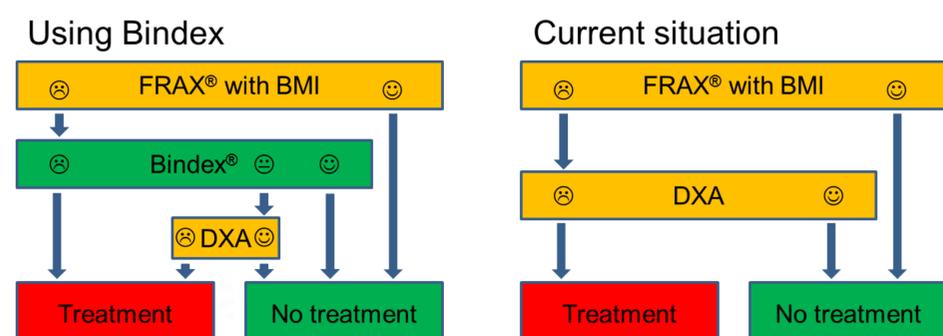


Figure 1. Case finding strategy for the osteoporotic patients using Bindex (left) and current Finnish strategy (right). The smileys indicate test results. ☹️:FRAX above age-dependent threshold; Bindex osteoporotic; DXA T-score below -2.5. 😐:Bindex ambiguous. 😊:FRAX below threshold; Bindex not osteoporotic; DXA T-score above -2.5. **Costs of DXA include the procedure as well as doctor visit, interpretation and travel costs (totally 423€). Total cost of Bindex in primary care is 259€ included 50€ screening cost and DXA when needed.**

RESULTS

- The average screening cost saved with Bindex[®] technique is 230€ (Table 1).
- At a cost of 50 euros per screen, the probability that Bindex[®] is cost-effective compared to the current pathway is 100% with our patient cohorts (Table 2).
- Bindex[®] appears to be cost-effective at prices as high as 100 euros per screen (Table 3).

Table 1. Estimated prevalence of OP with and without fracture, and screening cost saved per patient by including Bindex before DXA.

	65 y with fracture	75 y without fracture	75 y with fracture	85 y without fracture	85 y with fracture
Prevalence of OP %	49.1	42.8	42.0	42.8	31.7
Average screening cost saved (€)	227.08	228.62	228.79	228.62	231.30

Table 2. Incremental cost-effectiveness ratio (ICER, k€ per quality-adjusted life year (QALY) gained) showed that Bindex (test price 50€) is the cheapest pathway. Probability that Bindex is cost effective at a willing-to-pay of 20,000 € per QALY gained is 100% in every patient group.

	65 y with fracture	75 y without fracture	75 y with fracture	85 y without fracture	85 y with fracture
Average 10-year cost per patient (€, discounted)	Current: 8353 Bindex: 8167	Current: 12,019 Bindex: 11,857	Current: 12,049 Bindex: 11,885	Current: 11,751 Bindex: 11,554	Current: 11,633 Bindex: 11,434
Average 10-year utility per patient (QALYs, discounted)	Current: 6.213 Bindex: 6.213	Current: 4.294 Bindex: 4.293	Current: 4.294 Bindex: 4.293	Current: 1.837 Bindex: 1.836	Current: 1.845 Bindex: 1.844
ICER of current care vs. Bindex (k€)	493	146	153	261	186

Table 3. ICERs of current care vs. Bindex (k€ per QALY gained) for all patient cohorts with different Bindex screening costs showed that Bindex is the cheapest option for all cases.

Cost per Bindex screen	65 y with fracture	75 y without fracture	75 y with fracture	85 y without fracture	85 y with fracture
50 €	493	146	153	261	186
75 €	427	124	130	228	163
100 €	360	101	107	195	139

CONCLUSIONS

- If Bindex[®] screening were included in the Finnish care pathway, costs would be saved compared to the current pathway. Moreover, Bindex[®] screening can be shown to be cost-effective compared to current practice.

REFERENCES

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