

# COST-EFFECTIVENESS OF PRIMARY PREVENTION FOR HIP FRACTURES IN ELDERLY WOMEN

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## OBJECTIVES

General practitioners prescribe antiosteoporotic treatments to elderly women in spite of the lack of cost-effectiveness evidence. Our goal was to assess cost-effectiveness of primary prevention of osteoporotic hip fractures through opportunistic risk-based screening in elderly women at primary care.

## METHODS

A discrete event simulation model was built to evaluate osteoporotic opportunistic screening in primary care in women aged 70 to 89 years (Figure 1). Screening was based on a fracture risk score. Diet recommendations were considered for low risk women and osteoporotic treatment for high risk women. For intermediate risk women, treatment decision was based on a recalculated risk score that included bone mineral density (BMD). Risk assessments were performed biennially and the model accounted for costs of visits, BMD and treatments. The time until hip fracture was conditioned on osteoporosis presence. Occurrence of hip fracture changed the risk of death. Costs of acute and long-term care were included. Cost-effectiveness was analyzed from the National Health System perspective. Several cut-points for the risk of fracture were tested (Table 1). Sensitivity analysis was performed for the most cost-effective cut-points. Time horizon was 20 years. Costs were discounted annually at 3%. The simulation model was implemented using Arena (Rockwell Software) version 14.70.

Figure 1: Flow chart of the discrete event simulation model.

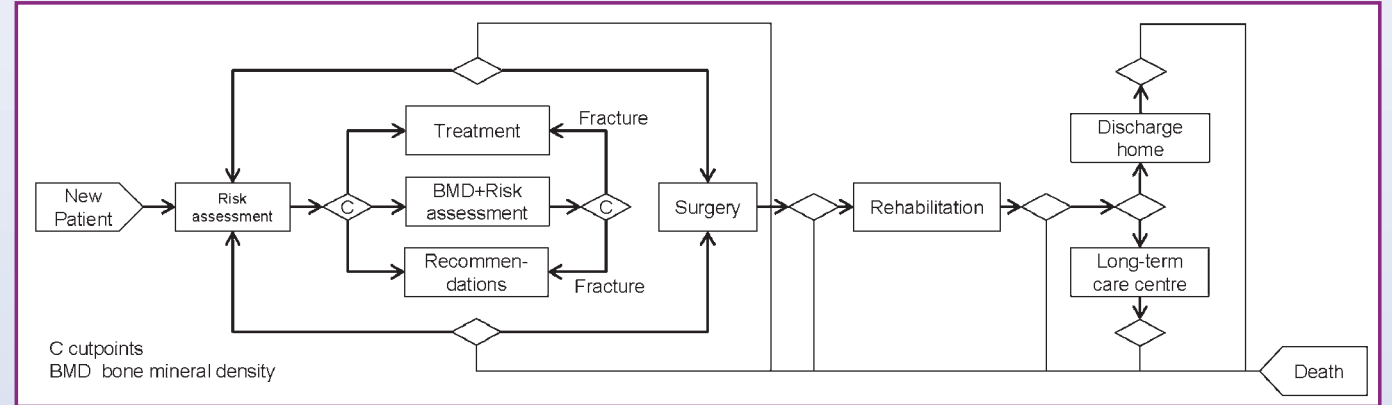


Table 1: Definition of scenarios according to FRAX cut-off points (without and with bone mineral density (BMD)).

	FRAX without BMD			FRAX with BMD	
	Recommendations	BMD	Treatment	Recommendations	Treatment
Scenario R	Todas				
Scenario 1	<5	>5		<7,5	>7,5
Scenario 2	<5	5-10	>10	<7	>7
Scenario 3	<5		>5		
Scenario 4	<3,5	3,5-10	>10	<7	>7
Scenario 5	<3,5	3,5-7	>7	<5,5	>5,5
Scenario 6	<3,5	3,5-5,5	>5,5	<4	>4
Scenario T			Todas		

## RESULTS

A total of 5,146 real women were included in the model. The most cost-effective preventive intervention had an ICER of 57,391€ per averted fracture compared to a baseline scenario without primary prevention (Table 2). This corresponded to cut-off points of less than 5% for low risk women, more than 5% for high risk women and no BMD (Figure 2). A 90% of simulations were cost-effective at a threshold of 90,000€. Sensitivity analysis based on the time until fracture, treatment effectiveness, adherence to treatment, discount level and cost of dependence resulted in ICER ranging from 39,216€ to 254,400€ (Figure 3).

Figure 2: Cost-effectiveness acceptability curves showing the probability that scenario 3, 6 and T are cost-effective compared to scenario R.

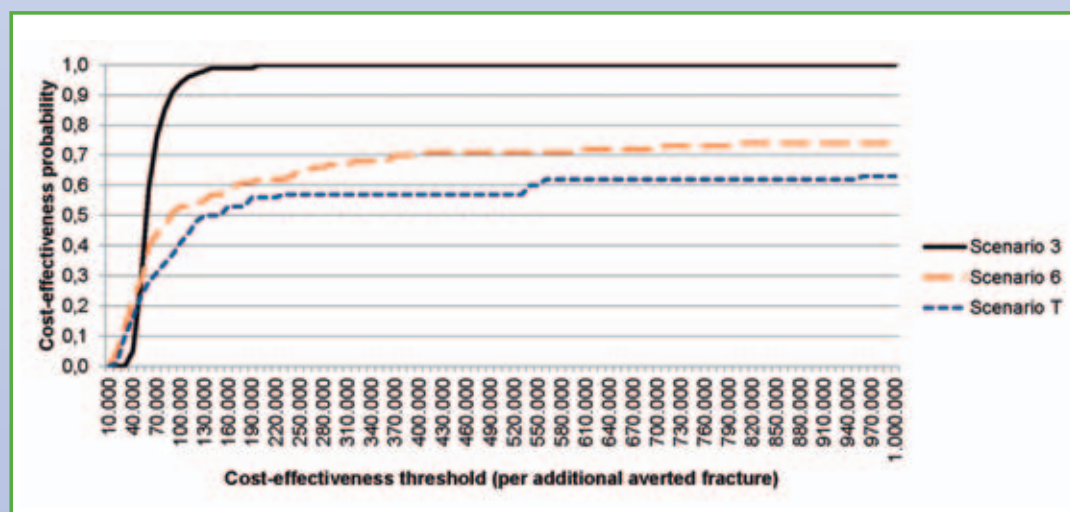
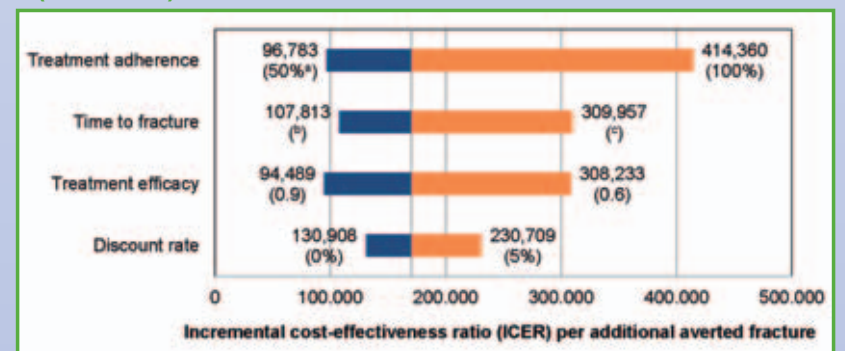


Table 2: Summary results from the cost-effectiveness analysis.

Scenario	Total cost	Hip fractures (n)	ICER (incremental cost-effectiveness ratio)
R	2,635,739€	701.05	-
2	7,024,826€	628.22	Excluded by extended dominance
3	7,076,619€	623.67	57,390 €
4	7,531,867€	622.47	Excluded by extended dominance
1	7,552,093€	629.13	Excluded by simple dominance
5	7,664,444€	619.12	Excluded by extended dominance
6	7,814,079€	615.99	96,023 €
T	8 893 921€	607.64	129,322 €

Figure 3: Tornado diagram of the one-way sensitivity analyses of the most cost-effective scenario (scenario 3).



<sup>a</sup>50% adherence as compared to the basal one, <sup>b</sup>same time to fracture in osteoporotic and non-osteoporotic patients, <sup>c</sup> 20% shorter time in osteoporotic patients  
The variables more sensitive to produce changes in the cost-effectiveness analysis are presented from top to bottom. The tails of each bar indicate the maximum and minimum ICER per additional averted fracture for each variable. The maximum and minimum values for each variable are presented in brackets.

## CONCLUSIONS

Primary prevention of osteoporotic hip fractures through opportunistic risk-based screening in elderly women at primary care was not cost-effective. General practitioners should be persuaded of prescribing such treatments to women without previous osteoporotic fracture.

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