

## Appendix 1 Explanation of the prediction sensitivity and positive predictive value calculated in this article

- ❖ *Point 1.* If 10 Caucasian women had a hip fragility fracture (FFx), and if all of them had a hip region dual energy X-ray absorptiometry (DAX) 1 day before the fracture incident and 6 of them had femoral neck (FN) T-score  $\leq 2.5$ , then we say the FN T-score detection sensitivity is 60% (6/10).
- ❖ *Point 2.* If a study report described the FN T-score of the mean value and standard deviation (or 95% confidence interval) of a group of hip FFx patients (say, n=100), and if we assume that individual FN T-score value of these data follow normal distribution, then we can generate simulated FN T-score values (n=100) of these patients. Following the discussion in *point 1*, then the FN T-score detection sensitivity can be estimated. These simulated FN T-score values for one single simulation will be less reliable when the number of cases is small, multiple simulations may be required. In the current study, all simulations were conducted at least twice, and for data with patient case n<100, simulations were conducted four times. Finally, the mean FN T-score detection sensitivity was adopted in this study.
- ❖ *Point 3.* Estimation of annual decrease of FN T-score and TH T-score:

Items	Source	Females		Males	
		Chinese	Caucasians	Chinese	Caucasians
FN BMD, g/cm <sup>2</sup> (loss/year)	Morin <i>et al.</i> (31)	-0.0004	-0.0022	-0.001	-0.0022
TH BMD, g/cm <sup>2</sup> (loss/year)	Morin <i>et al.</i> (31)		-0.0026	-0.0006	-0.0026
FN BMD, g/cm <sup>2</sup> (loss/year)	Lloyd <i>et al.</i> (32)		-0.002		-0.002
FN SD of young	Wang and Xiao (14)	0.110	0.113	0.125	0.125
TH SD of young	Wang and Xiao (14)	0.114	0.110	0.120	0.120
FN T-score (loss/year)	Morin <i>et al.</i> (31)	-0.00364	-0.01947	-0.008	-0.0176
TH T-score (loss/year)	Morin <i>et al.</i> (31)		-0.02301	-0.005	-0.02167
FN T-score (loss/year)	Lloyd <i>et al.</i> (32)		-0.0177		-0.016

SD of young, standard deviation of young adult population of a BMD reference database. Based on this table, approximately FN or TH T-score decrease by 0.02 per year. FN, femoral neck; TH, total hip; BMD, body mineral density.

For the discussion in *point 2*, if DAX was measured 1 year before hip FFx, the T-score is assumed to be 0.02 higher for each patient.

- ❖ *Point 4.* If 10 Caucasian women had a hip region DAX examination and 6 of them had FN T-score  $\leq 2.5$ , then these subjects were followed for 5 years. If 3 of these 6 osteoporosis cases had hip FFx during the observation period, then we say FN T-score positive prediction value is 50% (3/6) in this testing.