

## Preventing the Next Osteoporotic Fracture Award Category: Developing quality customer services

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### Introduction

Osteoporosis is a common disease in older men and women. Osteoporosis is characterised by reduced bone strength and a predisposition to fractures after minimal trauma.

A minimal trauma fracture is the most important clinical risk factor for further fractures (hence the terms "fracture cascade" or "domino effect").

Despite the availability of effective treatments that reduce risk of re-fracture, 70 – 80% of patients presenting with an incident osteoporotic fracture are neither investigated nor treated for their underlying condition, osteoporosis. Failure to treat results in excess patient morbidity and mortality, and causes enormous health care expenditure, all of which is easily preventable.

### Aim

To improve the care, quality of life and life expectancy of patients presenting with an incident minimal trauma fracture by reducing re-fracture rates through a targeted and co-ordinated multi-disciplinary post-fracture intervention service ("Fracture Liaison Service", or FLS).

### Methods

- Four-year prospective controlled observational study (2005 – 2009).
- Intervention: Patients > 45 yrs presenting with a non-vertebral minimal trauma fracture were offered referral to a clinical intervention program and treatment for osteoporosis, as indicated.
- Controls: Patients who elected to follow-up with their primary care physician.
- Re-fracture rates in the intervention group (FLS) were compared to the control group at 4 years.

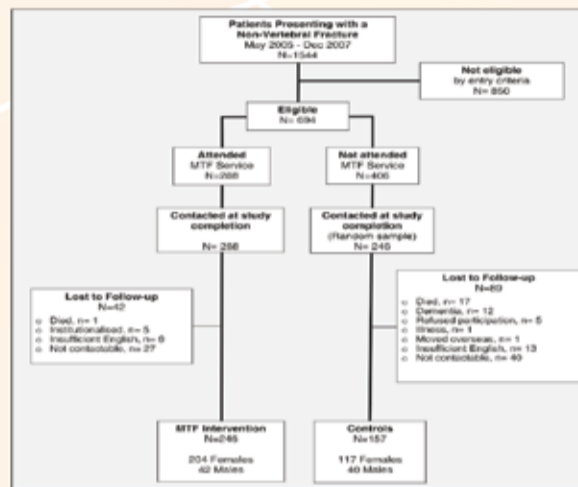


Figure 1. Participant flow diagram

### Results

- Both groups had similar baseline characteristics (Table 1).
- The incidence of re-fracture over 4 years was 4.1% in the FLS group vs. 19.7% in the control group ( $p < 0.001$ ). The risk of sustaining a re-fracture was reduced by 80% in the intervention group (Fig. 2).
- This difference in re-fracture rates between the groups was robust and remained significant in younger and older patients (Fig 3).

N	MTF 246	Control 157	P value
Age, years (mean ± SD)	66.4 ± 11	65.9 ± 12.8	0.70 <sup>f</sup>
Females	204 (83)	117 (75)	<0.05 <sup>e</sup>
Males	42 (17)	40 (25)	
Gender F/M	5:1	3:1	
BMI, kg/m <sup>2</sup> (mean ± SD)	27.8 ± 5.2	26.1 ± 5.4	<0.05 <sup>e</sup>
Height, cm (mean ± SD)	160.3 ± 8.9	163.1 ± 8.4	<0.01 <sup>f</sup>
Weight, kg (mean ± SD)	71.7 ± 15.5	69.3 ± 14.5	0.12 <sup>f</sup>
IRSAD (mean ± SD)	1036 ± 59	1039 ± 50	0.60 <sup>f</sup>
Prevalent non-vertebral fracture <sup>a</sup>	13 (5.3)	13 (8.3)	0.23 <sup>e</sup>
History of maternal hip fracture	8 (3.3)	3 (1.9)	0.42 <sup>e</sup>
Therapy with glucocorticoids (current or past)	10 (4.1)	9 (5.7)	0.44 <sup>e</sup>
Currently smoking	26 (10.6)	11 (7)	0.23 <sup>e</sup>
Current ethanol use <sup>b</sup>	22 (8.9)	9 (5.7)	0.24 <sup>e</sup>
Falls in past 12 months before index fracture	74 (30)	34 (21.7)	0.09 <sup>e</sup>
Site of index non-vertebral fracture			
Major <sup>c</sup>	171 (69.5)	100 (63.7)	0.26 <sup>e</sup>
Proximal femur	30 (12)	1 (1.3)	
Wrist	86 (35)	67 (42.7)	0.12 <sup>e</sup>
Minor <sup>d</sup>	75 (30.5)	56 (35.7)	0.28 <sup>e</sup>

Values are denoted as n (%), unless otherwise indicated  
 IRSAD Index of Relative Socioeconomic Advantage and Disadvantage  
<sup>a</sup> Any minimal trauma non-vertebral fracture that occurred after the age of 45 years;  
<sup>b</sup> >3 Standard drinks per day  
<sup>c</sup> Hip, pelvis, wrist, humerus, tibia and fibula  
<sup>d</sup> Other fractures sites except face/skull  
<sup>e</sup> Chi-square test  
<sup>f</sup> Student's t test

Table 1. Baseline characteristics of participants by group

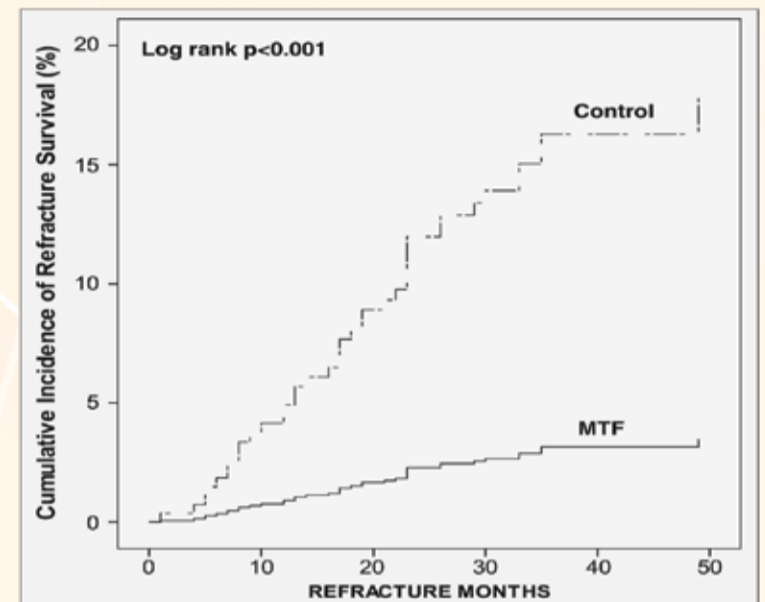


Figure 2. Cumulative incidence of re-fracture by group

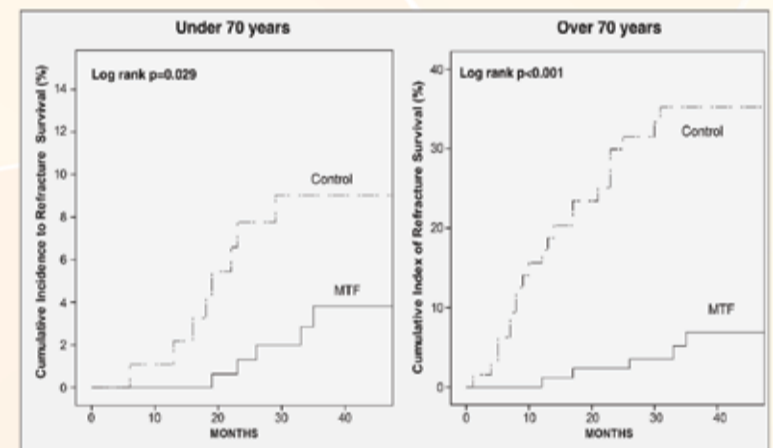


Figure 3. Cumulative incidence of re-fracture by age.

### Conclusion

The Concord Fracture Liaison Service has provided tangible improvements in osteoporosis care to the community, as demonstrated by clinically relevant outcome measures (re-fracture rates). Further analyses have shown this service to be also cost-effective (Cooper, Palmer and Seibel, 2012). This clinical care model is applicable to any health network.

### Acknowledgements

Thanks to Drs Haren Nandapalan, Connie Yap, Michael Kim and Paul Lee for their contributions to the original manuscript.

### References

- Lih, A, Nandapalan, H, Kim, M, Yap, C, Lee, P, Ganda, K & Seibel, MJ 2011, 'Targeted inter-vention reduces refracture rates in patients with incident non-vertebral osteoporotic fractures: a 4-year prospective controlled study', *Osteoporosis International*, vol. 22, pp. 849-58.
- Cooper, MS, Palmer, AJ, & Seibel, MJ 2012, 'Cost-effectiveness of the Concord Minimal Trauma Fracture Liaison service, a prospective, controlled fracture prevention study', *Osteoporosis International*, vol. 23 no. 1, pp. 97-107. Online Nov 2011.