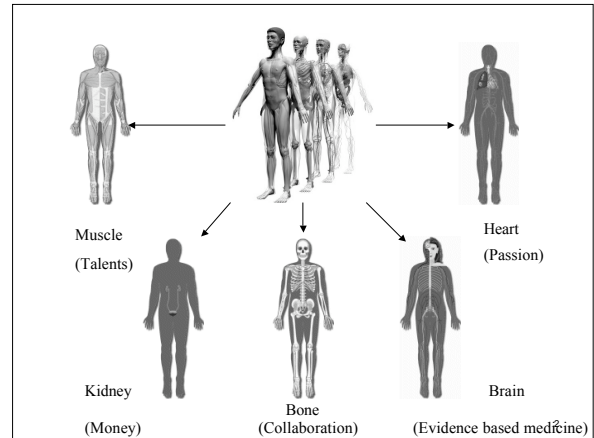


The Anatomy of an Osteoporosis Disease Management Program

Dr Lau Tang Ching



The Heart (Passion)

- Osteoporosis treatment and fracture prevention is worth doing

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Epidemiology

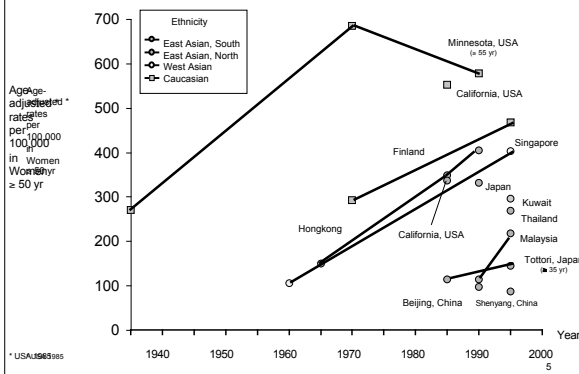
- Osteoporosis is likely to increase as the population of Singapore is aging rapidly
 - 1990 only 6% of the population > age 65
 - 2030, 17% >age 65
- Osteoporotic fractures at the hip, wrist and spine are increasingly common

Table 2. Crude hip fracture rates (per 100 000) in Chinese, Malay and Indian populations living in Malaysia and Singapore

	Chinese	Malay	Indian
Singapore			
Men	180	97	198
Women	437	233	242
Malaysia			
Men	94	27	98
Women	220	43	204

*The Asian Osteoporosis Study, Lau E et al Osteoporosis International (2001) 12:239-243

Secular Trends in Hip Fracture Incidence



Consequences of Fracture

- Hip fracture
 - mortality of 26% in the first year
 - Of the survivors, 9 % were bedridden and
 - 24 % wheelchair bound*
- Vertebral fracture
 - may be associated with back pain, disability or physical deformity
 - increase in mortality related to frailty, comorbidities and an increased risk of pneumonia
 - A history of vertebral fracture is associated with an increased risk of a subsequent fragility fracture.

*Ann Acad Med Singapore 1994; 23:76-8

Background....

- Cost of managing hip fracture:
 - \$S\$12,000 for the immediate hospital care and
 - \$S\$21,000 in total costs for the first year
- Numbers of hip fractures per year in Singapore increasing:
 - 1,200 in 1998 to 10,000 in 2050 because of the aging of the population.
- Total immediate hospital cost of these fractures is
 - \$S\$14.4 million in 1998 and \$S\$120 million by the year 2050.
 - If indirect cost is included, the total cost is \$S\$25.2 million in 1998, and \$S\$210 million in 2050.
- NHG and Singhealth institutions will likely manage 80% to 90% of these fractures.

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The Brain (EBM)

- There is good evidence that treatment for osteoporosis is effective in preventing fractures.

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Efficacy of population-based preventive approaches

Intervention	BMD	Vertebral fracture reduction	Hip fracture reduction
Dietary calcium	B	B	B
Calcium (\pm vitamin D) supplements	A	A	A
Exercise	A	B	B
Smoking cessation	B	B	B
Reduced alcohol intake	C	C	B
Fall prevention	-	-	-
Hip protectors	-	-	A

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Grades of Recommendations for Therapeutic Interventions

Drug	Benefit in BMD	Vertebral fracture reduction	Non-vertebral fracture reduction	Hip fracture reduction
Calcium & vitamin D	A	A	A	A
HRT	A	A	A	A
Alendronate	A	A	A	A
Risedronate	A	A	A	A
Ibandronate	A	A	A*	-
Zoledronate	A	A	A	A
Etidronate	A	A	B	B
Clodronate	A	-	-	-
Raloxifene	A	A	A*	-
Calcitonin	A	A	B	B
Calcitriol	A*	A*	A	-
Alfacalcidol	A	A	-	-
Anabolic steroids	A	-	-	B
Parathyroid hormone	A	A	A	-
Strontium Ranelate	A	A	A	A*
Fluoride	A	A*	-	-
Combination therapy	A	-	-	-

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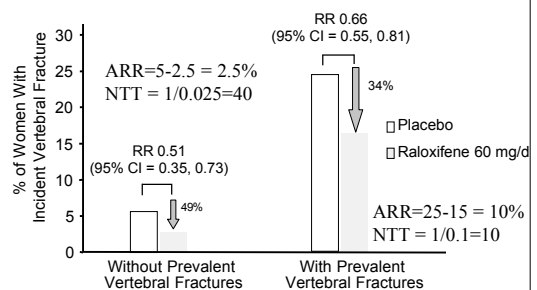
Factors to consider in decision to treat

Factors	Tend to treat if	Tend to defer if
Fracture risk	high	low
Past fracture	present	absent
BMD	lower (T-score < -2.5)	higher
Age	older (e.g. >65 years)	younger
Risk for falls / bone loss	high	low

Cost effectiveness: absolute fracture risk of patients, efficacy of therapy, cost of medication, cost of fracture

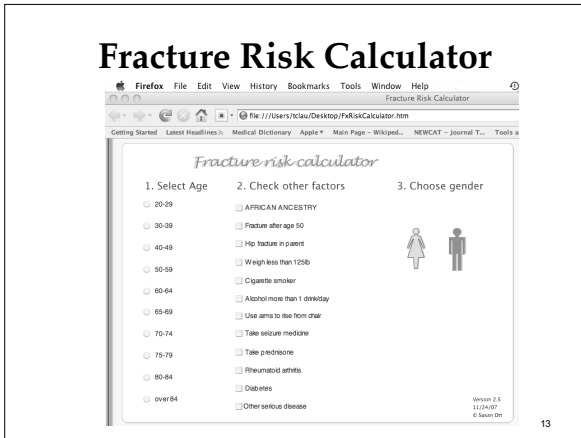
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Effect of Raloxifene in Women With or Without Existing Fractures MORE Trial - 4 Years



Eastell R, et al. *J Bone Miner Res.* 2000;15(suppl 1):S229.

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HSDP osteoporosis management program

- MOH funded program (2003 to 2007) which aims to prevent new fragility fractures in patients who have previous vertebra or non-vertebra fractures through education, exercise and medication in 3 NHG hospitals (TTSH, NUH, AH) and 9 NHG polyclinics
- This HSDP funded project provides the basis for the ODMP program

Analysis of the HSDP program (May 2007)

- Patients who are on appropriate therapy- improved from 16% to 45%
- Patient who are adherent to treatment- improved from 20% to 67%

Fracture rate/ year	Before	After	RRR
Hip	1.90%	1.49%	23.1%
Vertebra	4.26 % (1.0%)	2.56% (0.43%)	39.9% (57.0%)
Non vertebra	3.39%	1.39%	59.0%

n The overall reduction in fracture rate was 42.4%

The Bone (collaboration)

- Like minded individuals coming together to share ideas/ passions
- Having a common dream: to prevent fractures and improve outcome of our patients (mortality & morbidity, QoL)
- Having a common vision: dream with action plans, goals and timelines (EBM based)
- Working together, spreading the dream and visions, infect others to get their buy in, etc
- It is a team based patient centered approach.

The Kidney (Money)

- Some changes may not cost much money
 - Risk stratification of patients who are at high risk of fractures
- Some changes do cost money
 - Employment of case managers
 - Introduction of exercise program
 - Subsidy of medications
- Source of funding: hospital, HQIF, HSDP, RF, Industry, charitable organisation
- Future: ? medisave, insurance, etc

The Muscles (Talents)

- Find them, train them, use them, keep them
- Case managers, physiotherapist, IT expert, statisticians, finance expert, doctors, nurses, etc, etc

Aim

- To target every patient above 50 years old with previous fragility fracture for osteoporosis and fall risks evaluation, and to provide an integrated management for fracture prevention.
- To provide faster, better, cheaper and safer osteoporosis and falls risk screening and intervention.

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OPDMP program

- This project aims to provide faster, better, cheaper and safer osteoporosis and falls risk screening and intervention via osteoporosis treatment, falls prevention strategies to achieve secondary prevention of fragility fractures through Risk stratification, Right care, Right time and Right Sitting strategies
- Right Care is provided to all women and men > 50 years old with "low trauma" or fragility fractures from the wards and outpatients clinics. They will receive osteoporosis education, be given with calcium and vitamin D, appropriate pharmacotherapy and assessment for appropriate falls-risk reduction strategies.

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OPDMP program

- **Right timing** is achieved by encouraging patients to have osteoporosis and falls risks assessment, together with education and intervention in the 3 months after a fragility fracture. Only 10% of patients who have fractures more than 6 months previously have opted to participate in the HSDP program whilst as high as 40% were keen on participating when they have recently fractured.
- **Right provider** is made possible by the use of the appropriate level of trained staff (osteoporosis care coordinators) to perform tasks currently done by clinicians. This relieves clinicians to handle more complex and urgent cases. Patients who have been assessed, educated and started on appropriate therapy can be further managed by the primary health care physicians (e.g. GPs). This will mean **right sitting** of appropriate care.

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OPDMP program

- **Reduce illness** is realised by the prevention of recurrent fractures by identifying high risk patients early and providing evidence based pharmacotherapy and other interventions appropriately.

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Proposed ODMP program

- The Key Benefits of this programme are:
 - 1) Osteoporosis care coordinators using the team approach to conduct osteoporosis and falls risk assessment, and to provide fracture prevention education. The rate of recurrent fractures will be reduced by identifying high risk patients early and providing evidence based pharmacotherapy and other interventions
 - 2) Integration of care at both the primary and tertiary levels based on risk stratification and motivation level of patients at high risk of recurrent fractures, thus ensuring right sitting of right care at the right time. This will improve patient adherence and enhance the effectiveness of the interventions at optimal cost, which will likely result in better cost effectiveness of the programme.

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Who Are We Looking for?

- **Inclusion criteria**
 - Male of female patients of age 50 year old or greater
 - Patients with previous vertebra or non vertebra fragility fracture (except fracture below the ankles and distal to the wrists).
 - Agree to participate in the program and able to comply with interventions and follow up.

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— THE END