# Effectiveness of Multidisciplinary Clinical Pathway for Geriatric Patients with Acute Osteoporotic Vertebral Compression Fractures

*Cheung WY, Chiu PKC, Woo YC, Koon NF, Tsang PLC, Faan Y, Tsang P, Ng YL, Kwok TWW, Chan A, Kwong T, Fan TY, Kong LL*

# Introduction

- Osteoporotic vertebral fractures are common
- More than a hundred patients are admitted to our hospital per year
- Impose physical and psychosocial problems
- Account for significant health care expense
- Frequently requires multi-disciplinary treatment
- A multidisciplinary clinical pathway started in Jan 2016

# Objectives

- Prospective cohort study to assess the effectiveness of the clinical pathway
- Patients treated with the pathway were compared with those treated before implementation of the pathway to see any outcome differences

# Methodology

- A multidisciplinary clinical pathway was set up
  - Orthopaedists: Diagnosis and rule out neurological complications
  - Appropriate patients were recruited to the pathway

  - Endocrinologist: Management of osteoporosis
  - Geriatrician: Management of medical comorbidities
  - Nurses: Fall assessment and prevention, osteoporosis education
  - Occupation therapists: ADL assessment and training
  - Physiotherapists: Pain relieving and mobilization ex.
  - Prosthetics and orthotics: Thoracolumbar corset
  - Dietitian: Nutrition assessment and advice
  - Medical social workers: Placement problems

# Methodology

**Inclusion criteria**

- Age ≥ 65 years old
- Admitted for back pain
- X-ray shows osteoporotic vertebral compression fracture(s)

**Exclusion criteria**

- Fracture(s) resulted from high energy trauma
- Healed vertebral fracture(s)
- Patients with associated non-spinal fracture(s)
- Pathological fractures such as myeloma, spinal tumour and infection
- Patients with significant neurological deficits
- Patients with impaired renal function: eGFR < 30ml /min
- Patients refuse to follow the pathway

# Methodology

- Patients recruited to the clinical pathway from Jan 2017 – Sept 2017 were included to the study
- Prospectively collected data
  - Numeric pain score
  - Elderly mobility score
  - Modified Barthel Index
  - On admission and upon hospital discharge
  - Duration of acute and rehabilitation hospital stay

# Methodology

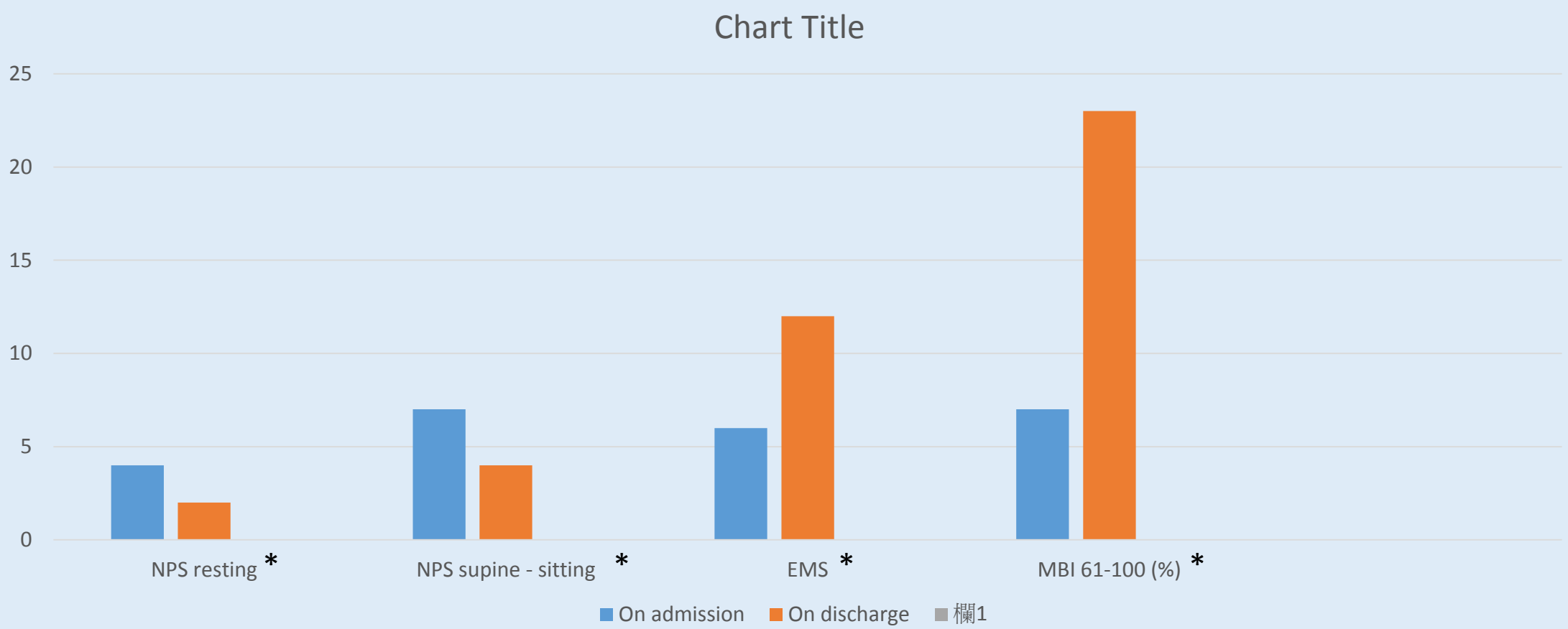
- Retrospective comparison with patients treated without the pathway
  - Review of patients treated without the pathway from Nov 2013 – June 2014
  - Assess length of stay in acute and rehabilitation hospital
  - Compared with those treated with the pathway

- Scale variables were analyzed with Wilcoxon test
- Ordinal and nominal variables were analyzed with Chi-square test

# Results

- 113 patients recruited to the prospective cohort
- 90 (80%) female
- Age 82 yrs
- Numeric pain score
  - Resting 4/10 → 2/10 ($p < 0.05$)
  - Supine to sitting 7/10 → 4/10 ($p < 0.05$)
- Elderly mobility score
  - 6/20 → 12/20 ($p < 0.05$)
- Modified Barthel Index of 61 – 100 (ADL slightly dependent or independent)
  - 7% → 23% ($p < 0.05$)
- Length of hospital stay
  - Acute hospital: 5 days
  - Rehabilitation hospital: 8 days

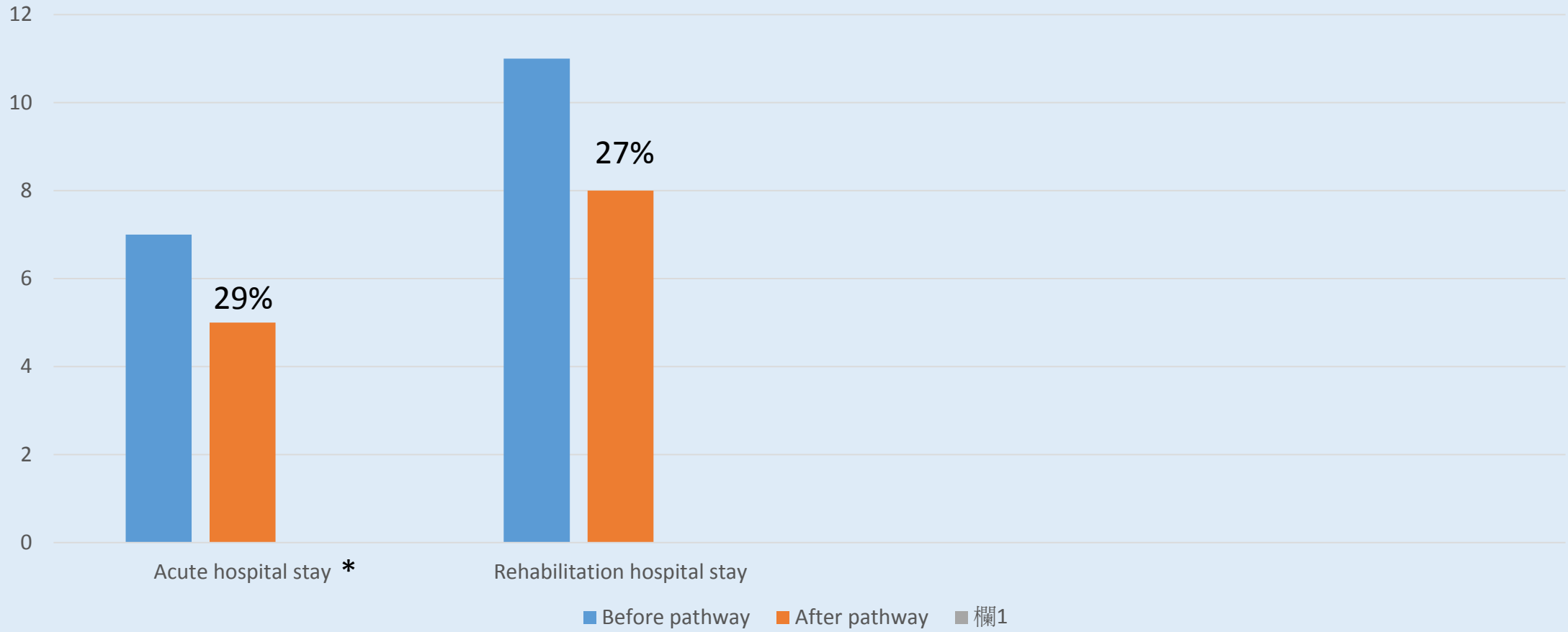
# Clinical outcomes



# Results

- 160 consecutive patients treated before the implementation of the pathway were reviewed
- Age 83 yrs.
- Female: 128 (80%)
- Length of hospital stay
  - Acute 7 days
  - Rehabilitation hospital 11 Days

# Hospital length of stay: Pathway Vs Non pathway



# Discussion

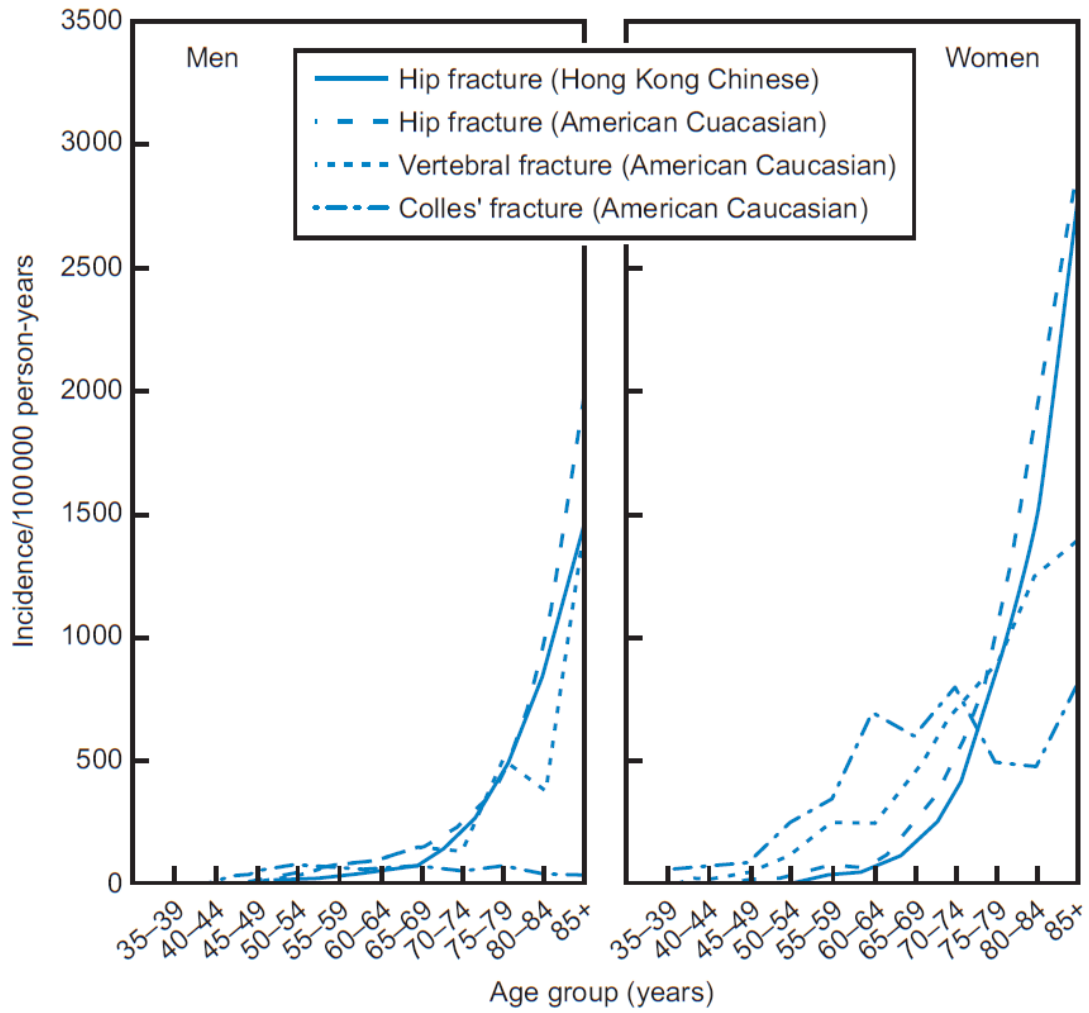
- Our population is aging.

| | 2014 年年中（基準）Mid–2014 (Base) | 2019 年年中 Mid–2019 | 2024 年年中 Mid–2024 | 2029 年年中 Mid–2029 | 2034 年年中 Mid–2034 | 2044 年年中 Mid–2044 | 2054 年年中 Mid–2054 | 2064 年年中 Mid–2064 |
|---|---|---|---|---|---|---|---|---|
| 0 至 14 歲 Aged 0 – 14 | 11% | 12% | 12% | 11% | 10% | 9% | 9% | 9% |
| 15 至 64 歲 Aged 15 – 64 | 74% | 70% | 67% | 63% | 62% | 61% | 59% | 58% |
| 65 歲及以上 Aged 65 and over | 15% | 18% | 22% | 26% | 28% | 31% | 32% | 33% |

Census and statistics department report, Sept 2015

# Incidence of Osteoporotic Fractures increases with age

| Male age | Chinese hip fracture | Caucasian hip fracture | Vertebral fracture | Colles' fracture |
|---|---|---|---|---|
| 35–39 | 4 | 5 | 4 | 5 |
| 40–44 | 9 | 6 | 6 | 10 |
| 45–49 | 10 | 12 | 10 | 50 |
| 50–54 | 16 | 45 | 40 | 80 |
| 55–59 | 29 | 80 | 75 | 60 |
| 60–64 | 55 | 100 | 100 | 60 |
| 65–69 | 88 | 150 | 150 | 70 |
| 70–74 | 211 | 250 | 130 | 50 |
| 75–79 | 454 | 450 | 500 | 70 |
| 80–84 | 870 | 1000 | 380 | 40 |
| 85+ | 1452 | 2000 | 1500 | 40 |
| Female age | | | | |
| 35–39 | 3 | 5 | 10 | 60 |
| 40–44 | 2 | 8 | 20 | 70 |
| 45–49 | 9 | 15 | 50 | 90 |
| 50–54 | 12 | 30 | 125 | 250 |
| 55–59 | 40 | 75 | 250 | 350 |
| 60–64 | 59 | 80 | 250 | 700 |
| 65–69 | 160 | 250 | 450 | 600 |
| 70–74 | 360 | 500 | 700 | 800 |
| 75–79 | 870 | 1000 | 900 | 500 |
| 80–84 | 1460 | 1950 | 1250 | 480 |
| 85+ | 2774 | 2900 | 1400 | 800 |




Melton LJ III. Epidemiology of fractures. In Riggs BL & Melton LJ III (eds) *Osteoporosis: Etiology, Diagnosis and Management*, pp 225–248. New York: Raven Press, 1995.

# Discussion

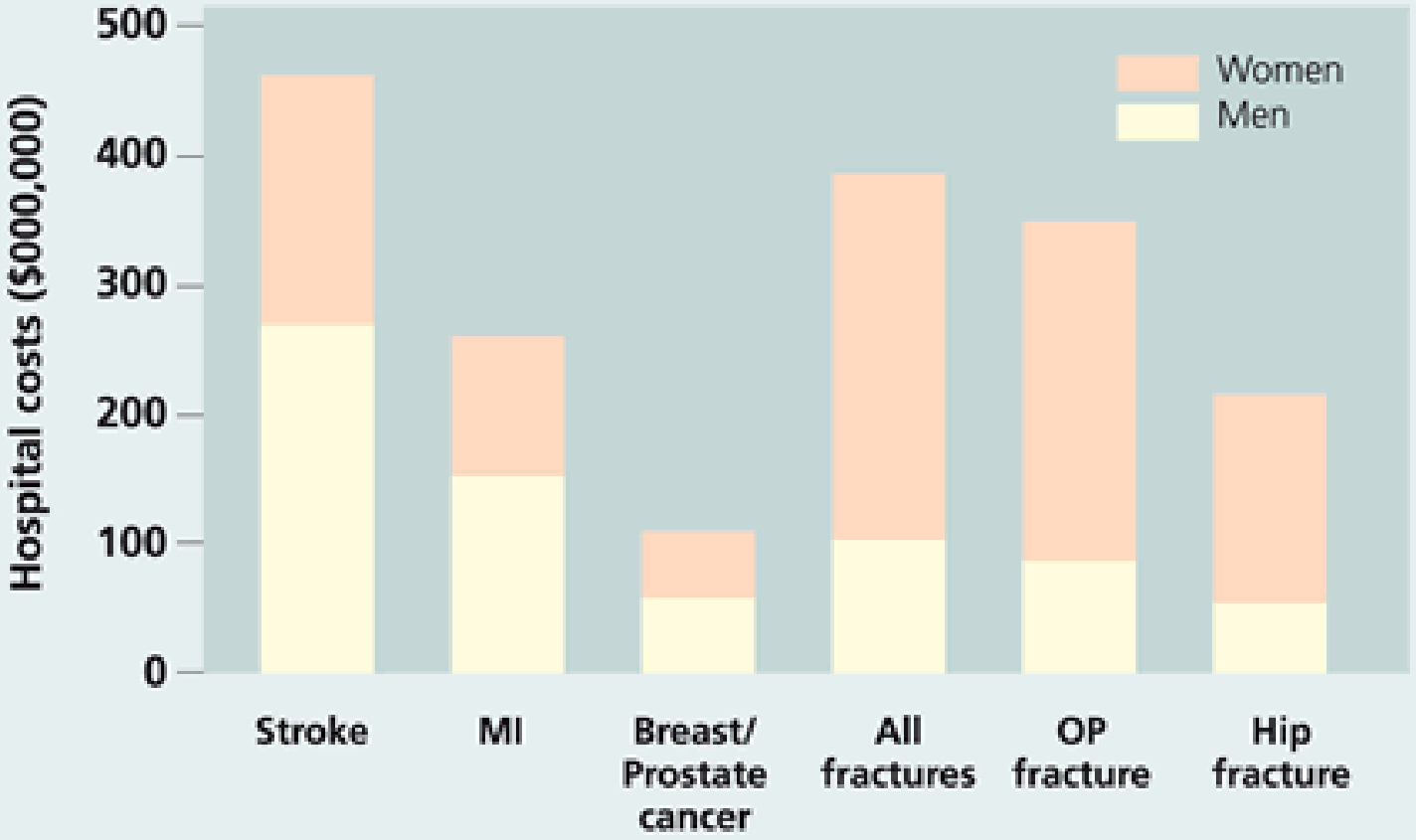
- Prevalence of osteoporotic vertebral fractures
  - Age 60 – 69 yrs: 19%
  - Age 70 – 79 yrs: 44 %
  - Age > 80 yrs: 68%

Tsang SWY et al. Osteoporosis Int, Vol 22, pp. 667-674, 2011

# Discussion

- Consequence of osteoporotic vertebral fractures
  - Pain
  - Impaired mobility
  - Respiratory complication
  - Impaired ADL
  - Lower self esteem
  - Depression

# Burden of hospitalized fractures vs other disease states in Sweden




Adapted frm Johnell O, Kanis JA, Jonsson B, Oden A, Johansson H, De Laet C. The Burden of Hospitalized Fractures in Sweden. Osteoporos Int (2005) 16:222-228

# Discussion

- Osteoporotic vertebral fractures is a huge disease burden
- Improve effectiveness and efficiency can benefits patients and health care providers
- Multidisciplinary team
  - Speed up the referral to relevant medical and allied health specialties
  - Speed up medical and rehabilitation treatment
  - Osteoporosis is actively treated

# Discussion

- Effectiveness of multidisciplinary clinical pathway for osteoporotic vertebral fractures has not been reported
- Our study found that
  - Can improve pain and function of patients
  - Can reduce the in-patient stay in acute hospital
    - Less waiting time required for allied health assessment and fabrication of spinal orthosis
    - With geriatricians support, patients with minor medical problems can be transferred earlier to rehabilitation hospital
  - A trend towards shorter rehabilitation hospital stay
    - Early social worker involvement for placement issues
  - May reduce re-fracture rate
    - Active treatment of osteoporosis

# Conclusion

- Multidisciplinary clinical pathway significantly improved pain and function of elderly suffered from osteoporotic vertebral compression fractures
- Significantly reduced patients' length of stay in acute hospital