# The Burden of Brittle Bones

# Epidemiology, Costs & Burden of Osteoporosis in Australia

# 2007

Prepared by

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For
Osteoporosis Australia

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## Executive Summary

- In 2007 Osteoporosis imposes a huge burden on the Quality of Life of Australians aged over 50 years, with approximately 25% of those who sustain a hip fracture, dying, within 12 months of sustaining the fracture.
- Of those who do not die following their hip fracture – 50% require long-term help with routine activities and cannot walk unaided and 25% require full-time nursing-home care.
- The cost burden of Brittle Bones remains extremely high with over 1.9 billion dollars alone in direct costs – including hospital treatment, rehabilitation, therapy, home care. As our older population increases these costs can only escalate.
- Someone is now admitted to hospital with an osteoporotic fracture every 5-6 minutes in 2007 (up from every 8.1 minutes in 2001) – averaging 262 hospitalisations per day.
- Vertebral fractures are largely undetected or treated. Studies have shown that there is at least a 2 fold increased risk of hip fracture after a vertebral fracture, thus timely diagnosis and treatment after a vertebral fracture might avoid a high number of new fractures including hip fractures(7).
- Since the 2001 'Burden of Brittle Bones' Report, several major achievements have occurred;
    - 2002 Osteoporosis announced as the 7th National Health Priority,– ***Arthritis & Musculoskeletal Diseases***. This initiative was renewed in 2006 as the ***Arthritis & Osteoporosis Better Care program*** with a budget measure attached until 2010
    - National Action Plan & National Service Improvement Framework for Osteoporosis developed
    - 2005 Vitamin D & Calcium Summit held
    - 2007 a rebate is announced for Bone Mineral Density (BMD) for all Australians aged 70 years and over (without a prior fracture)
    - 2007 oral bisphosphonate medications are placed on the PBS for primary prevention of fracture (Australians aged 70 years or older who have a BMD of -3.0 or lower) and strontium ranelate will also be available for this indication from November 2007 (women aged 70 years or older).
    - Significantly increased awareness and education programs implemented nationally for consumers and health professionals (only since 2005)
- However, with all the above, ***Osteoporosis still remains the great undetected and untreated National Health Priority Disease.*** This means that even after a 70 year old person fractures their hip and has an emergency hip replacement, or a 50 year old woman fractures her wrist and has a pin inserted, no one says to them 'you have osteoporosis' and instigates treatment.
- Spending on musculoskeletal conditions is high compared to other health priority areas –

We recommend-

- ***Better detection and treatment opportunities*** and education programs need to be facilitated in ***rural and remote areas of Australia***
- A Pilot program for a ***'fracture co-ordinator'*** in 'area health regions' in Australia be implemented to capture those who sustain their first osteoporotic fracture and to see them appropriately managed

## Background

In 2001, Osteoporosis Australia published The Burden of Brittle Bones: Costing Osteoporosis in Australia (1). This was a landmark paper that for the first time gave us a true picture of some of the costs and burden of fragility fractures. In 2001;

- There were 1.9 million Australians with osteoporosis
- Someone was admitted to hospital with a fragility fracture every 8.1 minutes in Australia, rising annually.
- 1.9 billion dollars per year were spent in direct costs
- Several billion dollars were lost in indirect costs such as – lost earnings, volunteer carers, home modifications.
- QALYS (Quality Adjusted Life Years = estimating the years of healthy life lost due to a disease)– 25,000 years of healthy life in 2001, with over half of these years lost due to premature death, and the remainder due to disability and burden of disease.

## Key learnings from the 2001 report

- It is vital to have current statistics on osteoporosis specifically pertaining to your country – sound economic modelling showing the costs and burden of the disease to the wider community
- It supports your position on osteoporosis by providing a fully researched document that argues your case
- The most important statistics to gather are; epidemiology, costs, burden, fracture numbers and common sites, disability and death rates
- Main points from the paper should be simple and clear
- Promote the main statistics in as many avenues as possible and to as many people of influence as possible (Health Departments, medical journals, government departments, business, community groups etc)

## How the report was used – achievements since 2001

- The first White Paper was launched by the then federal minister for health, at the Australian Fracture Prevention Summit, in October 2001. This received very effective coverage.
- The Summit proceedings and key findings from the paper were then published as a supplement in the Medical Journal of Australia (April 2002, Australia's leading medical journal).
- The White Paper was used in an intense advocacy campaign to get osteoporosis listed as the 7$^{th}$ National Health priority in Australia. This overlapped with an intensive awareness and media campaign about osteoporosis – our CSA was played extensively on prime time around Australia over that time period.

- The new federal health minister announced Arthritis and Musculoskeletal Diseases to become the 7th National Health Priority in September 2002 – the focus of the priority was to be Osteoarthritis, Osteoporosis and Rheumatoid Arthritis. The priority also had a budget measure attached for 4 years.
- In 2005, a landmark Vitamin D & Calcium Forum was held in Melbourne, to bring all key stakeholders together to develop national recommendations for calcium and vitamin D.
- The priority has now become the Arthritis and Osteoporosis Better Care Program and a budget measure of 14.5 million dollars was renewed in 2006 (2006-10).
- In December 2006, the Prime Minister and the Health Minister announced that from April 1, 2007;
    - A Medicare rebate would be available for all Australians aged 70 and over, to have a BMD test (by DXA)
    - All oral alendronate medications would be on the PBS for men and women over 70 with a T-score of -3.0 or below
    - From August 1, all risedronate medications would also be on the PBS for the same indication.

This was a big win for OA, ANZBMS and all other key stakeholder groups who have been advocating for these changes for many years.

**From April 1, 2007 a Medicare rebate for BMD testing by DXA is available for men and women aged 70 years and over.**

**As of 1 April 2007, alendronate (in the form of Fosamax®, Fosamax Plus, and Alendro®) is available on the PBS for patients with osteoporosis aged 70 years and over who have a T score at the spine or femoral neck of -3 or less.**

**From August 1, 2007, risedronate (in the form of Actonel and Actonel Combi) is available on the PBS for the same indication as above.**

**From November1, 2007, strontium ranelate (in the form of Protos®) is available on the PBS for women with osteoporosis aged 70 years and over who have a T score at the spine or femoral neck of -3 or less.**

## Key Findings in Australia in 2007

- 2.2 million Australians have an osteoporosis related condition - this will become 3 million by 2021.
- 1.65 million are women.
- 0.51 million are men
- Arthritis and musculoskeletal conditions constituted the third largest component of the health expenditure, after cardiovascular diseases and nervous system disorders, with an estimated expenditure of $4.6 billion (2).This equates to 9.2% of allocated health expenditure.
- Someone is admitted to hospital with an osteoporotic fracture every 5-6 minutes, averaging 262 hospitalisations per day.
- Osteoporosis accounted for only 0.6% of all problems managed by GPs.

- Around 64,000 hospital separations in Australia every year are for bone fractures in people aged 55 and above. A large proportion of these separations can be attributed to osteoporosis.
- Hip fractures constituted more than 37% of all fracture separations among those aged 55 and over; the proportion increased to 55% among those aged 85 and over.(2)
- Approximately 25% of people who sustain a hip fracture die within 12 months of the fracture, with this rate increasing in older populations
- Deaths associated with fall-related hip fractures are often attributed to other underlying causes.
- The number of Australians sustaining hip fractures each year is projected to increase by 15% every five years until 2026. A fourfold increase in hip fractures is expected by 2051, when about 23% of Australia's projected population will be aged 65 years and over 8% of the population will be aged 85 years and over.
- Population projections suggest that the number of vertebral, humeral and pelvic fractures will increase by 12% every five years until 2036, and then by 6% every five years until 2051(8).
- In both women and men the mortality was increased in the first year after all major fractures including the proximal femur, vertebral and groupings of other major and minor fractures. However the increase in mortality after vertebral fracture was thought to be associated with silent vertebral fractures (12).
- There has been no significant increase in the number of people being treated after first fracture. Thus, despite both the magnitude of the problem and the introduction of osteoporosis treatment guidelines, most high risk individuals (80-90%) with fragility fractures of the spine, forearm and hip remain uninvestigated and untreated(35).

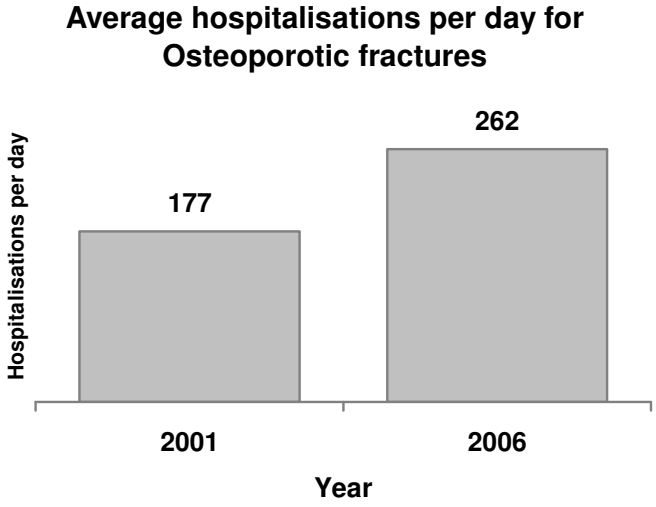
## Comparison Chart '2001 findings to 2007 findings'

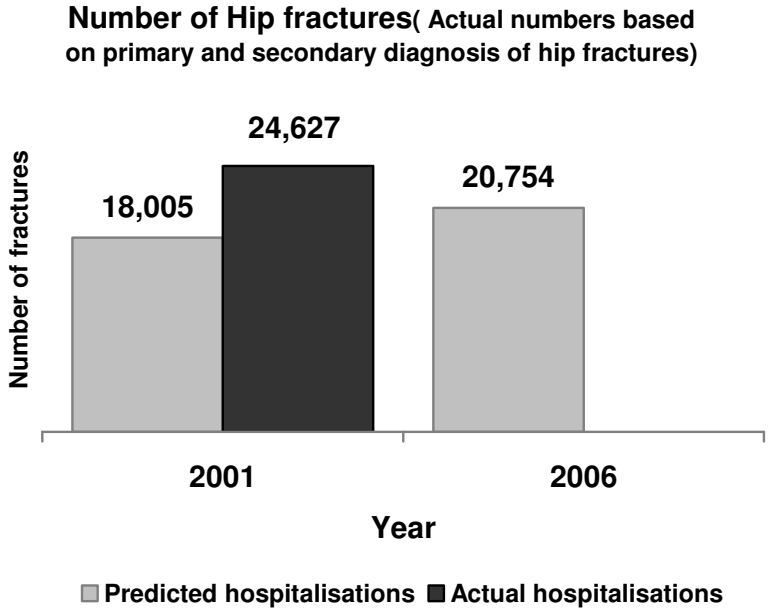
Key findings comparison chart 2001 to 2007

| | 2001 | 2007 |
|---|---|---|
| No's with Osteoporosis in Australia (in millions) | 1.9 | 2.2<br>(2021: 3 million) |
| Hospital admission rates with osteoporotic fracture | 1 admission every 8.1 minutes | 1 admission every 5-6 minutes |
| Average hospitalisations per day for osteoporotic fracture | 177 | 262 |
| Predicted annual number of hip fractures | 18,005 | 20,754 |
| Actual number of hip fractures<br>(Based on principal diagnosis) | (21,886<br>( 02-03) | 24,410 ( 05-06)[a] |

| | | |
|---|---|---|
| Deaths due to hip fractures<br>(Hip fracture as associated cause of death) | 1582 ( 2002),<br>1681(2003) | 1481 ( 2005) |
| Vertebral fractures (Predicted numbers) | 13,000 | 14,551 (2008) |

Source:
a : AIHW analysis of National Hospital Morbidity Database. Hospital separations of hip fractures, persons > 40 years.05-06




## Recommendations

It is strongly recommended that;

- A Fracture Co-ordinator be appointed in area health services across Australia who would follow-up and co-ordinate the care of every Australian who has sustained their first fragility fracture (3, 4).
- A pilot model of care be implemented in the hospitals which would include employing a qualified fracture coordinator to identify potential patients in need for anti-osteoporotic therapy and for the ongoing care and follow up e.g. organising DXA testing, screening tests, liaison with GPs, organising exercise /falls prevention programs etc.This strategy has been proven to be cost effective in a recently published study by Vaile et al (3)
- Specific fracture protocols be integrated into the inpatient outpatient hospital setting.
- Consideration of extending reimbursement for DXA scans should be made for patients aged<70 years at increased risk of osteoporosis.
- Efforts should be made to make DXA scan easily available for people in rural and remote areas in Australia.
- Better detection and treatment opportunities and education programs need to be facilitated in rural and remote areas of Australia
- Improvement in the capacity for self management through access to education and healthy lifestyle strategies should be made to help people develop the knowledge, skills and confidence to self manage Osteoporosis.
- Resources should be available to fund large scale research projects which are evidence based and provide tools for early identification, recognition and post fracture treatment and management of osteoporosis both by the health care profession and in the community. The aim is to reduce the fracture burden in Australia.

# The Burden of Brittle Bones in Australia in 2007

## 1 Definition

The WHO Working Group defines osteoporosis according to measurements of bone mineral density (BMD) using dual-energy X-ray absorptiometry (DXA). Thus osteoporosis is defined as a bone density T scores at or below 2.5 standard deviations (T score) below normal peak values for young adults.

| | |
|---|---|
| Normal bone density | T score > -1 |
| Osteopenia | T score between -1 and -2.5 |
| Osteoporosis | T score < -2.5 |
| Severe osteoporosis | One or more fragility fracture and T score <-2.5 |

These criteria were initially established for the assessment of osteoporosis in Caucasian women. BMD reports may include a "Z score" which is the number of standard deviations by which the BMD of the subject differs from the mean for their age and sex. This is of greater clinical utility in younger individuals and if < -2 it indicates the need for investigation to exclude secondary causes of osteoporosis.

The WHO definition of osteoporosis only takes into consideration measurement of bone density, with no component of bone quality.

A clinical definition of osteoporosis was developed in 2001 by the NIH Consensus Development Panel on Osteoporosis. It stated: "Osteoporosis is defined as a skeletal disorder characterised by compromised bone strength predisposing a person to an increased risk of fracture". This definition takes into consideration that there are other factors that influence bone quality such as the micro architecture of bone. However, measurement of BMD remains the most useful clinical tool available for diagnosing osteoporosis.

## 2 Epidemiology

Osteoporosis is often called a 'silent' disease as a fracture is often the first sign. Osteoporosis is the disease and fractures are the outcome we are trying to prevent. The morbidity of this condition arises from bone fragility and the subsequent fractures that result, causing not only pain, but also deformity and even immobility.

- 2.2 million Australians have an osteoporosis related condition - this will become 3 million by 2021
- 1.65 million are women.
- 0.51 million are men
- Currently osteoporosis affects 10.1% of the Australian population.

- Among those aged over 60, one in two women and one in three men will have fractures due to osteoporosis (56% in women over 60 years).
- In Australia in 2007, someone is admitted to a hospital with an osteoporotic fracture every 5-6 minutes, with an average of 262 hospitalisations per day (8.1 minutes in 2001 with an average of 177 hospitalisations per day). This is set to increase to every 3.5 minutes by 2021, if more is not done.
- The direct costs associated with these fractures amount to an estimated 1.9 billion dollars each year in Australia.
- Of all reported osteoporotic fractures, 46% are vertebral, 16% are hip and 16% are wrist fractures.

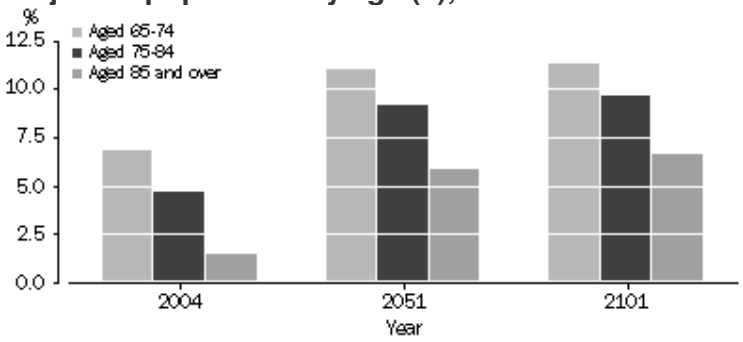
There is general concern that the prevalence of osteoporosis is likely to increase over the next few years due to the increasing life expectancy of the population. (Table1). It is projected that by 2021, osteoporosis will affect some 13% of the Australian population. In 2002, 1.9 million people in Australia had osteoporosis. In 2006, this number had increased to 2.2 million and is expected to increase to 3 million by the year 2021(1)

**Table 1: Prevalence projections, 2006-2021, by gender and age**

| **2006** | **0-14** | **15-24** | **25-34** | **35-44** | **45-54** | **55-64** | **65-74** | **75&over** | **Total** |
|---|---|---|---|---|---|---|---|---|---|
| Men | - | 2.8 | 21.8 | 30.5 | 26.4 | 75.3 | 192.9 | 155.7 | 505.4 |
| Women | - | 7.3 | 28.0 | 90.8 | 251.5 | 488.9 | 369.6 | 413.8 | 1,649.8 |
| Persons | - | 10.1 | 49.8 | 121.2 | 276.2 | 562.5 | 564.4 | 573.6 | 2,157.7 |
| **2011** | **0-14** | **15-24** | **25-34** | **35-44** | **45-54** | **55-64** | **65-74** | **75&over** | **Total** |
| Men | - | 2.8 | 21.8 | 31.2 | 27.8 | 85.9 | 232.4 | 173.0 | 575.0 |
| Women | - | 7.5 | 28.0 | 92.4 | 265.3 | 569.4 | 436.7 | 443.0 | 1,842.2 |
| Persons | - | 10.3 | 49.8 | 123.7 | 290.9 | 648.4 | 673.2 | 623.6 | 2,419.9 |
| **2021** | **0-14** | **15-24** | **25-34** | **35-44** | **45-54** | **55-64** | **65-74** | **75&over** | **Total** |
| Men | - | 2.7 | 22.8 | 31.3 | 29.0 | 96.9 | 335.7 | 239.2 | 757.7 |
| Women | - | 7.3 | 29.2 | 91.5 | 274.9 | 651.7 | 640.9 | 557.2 | 2,252.7 |
| Persons | - | 10.0 | 52.1 | 123.4 | 302.4 | 736.8 | 980.2 | 816.7 | 3,021.6 |

Source: AE projections based on maintained prevalence distributions within demographic groupings applied to ABS (2001) population projections for each demographic group.

**Projected population by age (a), 2004 to 2101**




(a) Population projections, Series B

*Source: Australian Bureau of Statistics 2005, Population Projections, Australia, 2004-2101, (3222.0)*

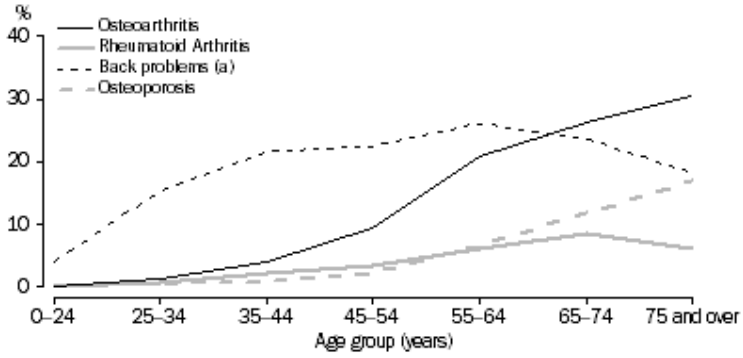
In 2004 the number of older persons aged 65 or more in Australia was estimated to be 2.6 million, or around 13% of the entire population (*ABS 2005 Population Projections, Australia)*. The proportion of older people in the population is projected to increase over time to 26% in 2051 and to 27% in 2101 (*ABS 2005 series B*), or to 28% and 31% respectively (*ABS 2005 series C*)

By 2101 the proportion of males in the 85 years or more age group is projected to increase, from 32% of all people aged 85 years or more in 2004 to between 44%-47% in 2101. This is due to the expected narrowing of the gap between male and female life expectancy (*ABS 2005 Population Projections Australia*).

**Arthritis and musculoskeletal conditions constituted the third largest component of the health expenditure, after cardiovascular diseases and nervous system disorders, with an estimated expenditure of $4.6 billion (2). This equates to 9.2% of allocated health expenditure.**

The prevalence of osteoporosis also increased with age, with 12% of persons aged 65–74 years and 17% of persons aged 75 years reporting osteoporosis. (See diagram below)

**Musculoskeletal conditions by age, 2004-05**




(a) Includes back pain, back problems n.e.c and disc disorders

*Source: National Health Survey: Summary of Results, 2004–05 (cat. no. 4364.0)*

As many as 4 out of 5 people with osteoporosis don't know that they have it although they are at risk of fracturing a bone. More than 3 out of 4 people with known osteoporotic fractures are not treated to prevent further bone loss and

stop the fracture cascade. This is in spite of the fact that women who have suffered a vertebral fracture are 4 times more likely to sustain a new vertebral fracture within a year. This risk increases with prior vertebral fractures (5). The presence of a vertebral fracture also increases the risk of sustaining a hip fracture. Studies have shown that there is at least a 2 fold increased risk of hip fracture after a vertebral fracture (6), thus early diagnosis and treatment after a vertebral fracture might avoid a high number of new fractures including hip fractures. A recent large population based prospective study of men and women demonstrated that there was an increased risk of subsequent fracture following virtually every low trauma fractures and hence the need for timely fracture preventive therapy (7).

**Projections for Hip fractures.**

The number of hip fractures in Australian women is projected to increase from 11 300 per year in 1996 to 44 700 in 2051. In men, the number is projected to rise from 4 000 to 15 300 (8). Figure A below shows the projection for all people aged 35 years or over.

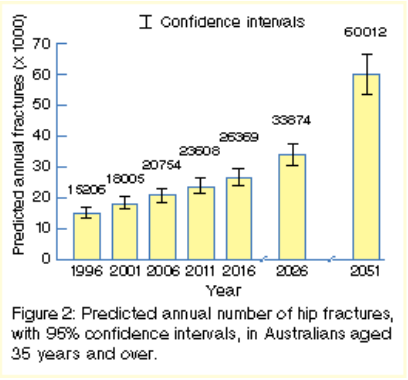


Figure 2: Predicted annual number of hip fractures, with 95% confidence intervals, in Australians aged 35 years and over.

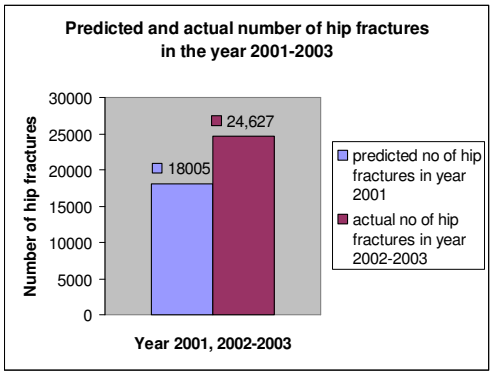



Figure **A** ( Sanders et al MJA 1999) [8]

Figure **B (** Actual numbers based on prim & sec diagnosis)

Data from the AIHW (Hip fracture injuries) (9) report indicated total hospital admissions for either a primary diagnosis of hip fracture( 21,886 cases) or secondary diagnosis of hip fracture (2641 cases) in 2002-2003 to be a total of 24,627 cases. This exceeded the predicted annual number of hip fracture cases for the year 2001(predicted 18,005 cases) by 6622 or by 27%.A recent analysis of national hospital morbidity database conducted by AIHW showed that the total hospital separations for hip fractures in persons aged 40 years and older in the year 2005-2006 to be 24,410 (hip fracture was the principal diagnosis).This indicates an increase of 2,524 cases since 02-03.

The number of Australians sustaining hip fractures each year is projected to increase by 15% every five years until 2026, then by about 10% every five years until 2051. A fourfold increase in hip fractures is expected by 2051, when about 23% of Australia's projected population will be aged 65 years (compared with 12% in 1996) and over 8% of the population will be aged 85 years and over (compared with 2% in 1996) ( 8)

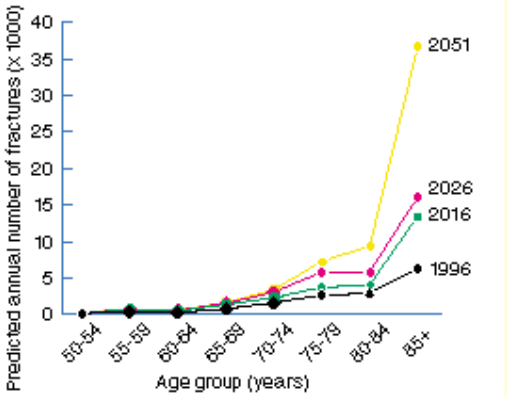



Figure 4: Predicted annual number of hip fractures by five-year age group for the years 1996, 2016, 2026 and 2051. The projections shown begin at age 50, as hip fracture is uncommon in people aged between 35 and 49 years.

Source; Sanders et al MJA1999 [8]

Hip fractures impose a heavy cost burden on the community, both in terms of acute care and rehabilitation.Australian hospitalisations data records episodes of care**.** Some patients may have more than one episode of care subsequent to their initial admission to hospital (9).

Around 64,000 hospital separations in Australia every year are for bone fractures in people aged 55 and above. A large proportion of these separations can be attributed to osteoporosis. Hip fracture (fracture of the femur) was the most common reason for hospitalisation, followed by fracture of the forearm and the lower leg. Hip fractures constituted more than 37% of all fracture separations among those aged 55 and over; the proportion increased to 55% among those aged 85 and over.(2)

The ALOS (average length of stay) for separations in relation to these fractures was 8.0 days, but was higher for fracture of the neck of the humerus (11.1 days), fracture of the femur (12.8 days) and fracture of the pubis (13.4 days).

One of the largest causes of mortality due to osteoporosis is hip fracture. Mortality within 12 months of a hip fracture is estimated to be around 20- 30%; the rates are higher in older populations (10). The attributable fraction for osteoporosis in hip fracture has been estimated to be around 0.47 among those aged 65 and over (11).

The table below shows that while the highest number of bed days was associated with episodes of acute care, the bed days for episodes or rehab was also high.

*Type of hip fracture hospitalisation episode by total number of bed days. (9)*
**Table**

| **Type of case** | **Total bed days** |
|---|---|
| Episodes where principal diagnosis was hip fracture | 244,178 |
| Episodes where principal diagnosis was rehabilitation and hip fracture was among the additional diagnoses | 195,850 |
| Episodes where principal diagnosis was NOT rehabilitation, but hip fracture was among the additional diagnoses | 88,709 |
| **Total** | **528,737** |

Hip fractures impose a heavy burden on the health system. To illustrate this, length of stay in hospital for hip fractures was compared with that for head injury, another common injury outcome. The total number of bed days associated with acute care episodes for hip fractures was 244,178 days compared with 160,407 for head injury, making it 1.5 times as costly in terms of its initial drain on hospital resources. The mean length of stay in hospital for hip fractures was 11.2 days compared with 2.7 days for head injuries. (2)

In assessing the burden of hip fractures, it is also important to note that not only do episodes of acute care contribute to this burden, but so too do the many bed-days associated with rehabilitation. The fact that most hip fractures affect the elderly, where co-morbidities are usual, probably results in a significant underestimation of the extent of hip fracture hospitalisations and deaths. Work undertaken at NISU (National Injury Surveillance Unit) indicates that deaths associated with fall-related hip fractures are often attributed to other underlying causes (9). Perhaps similar processes affect the recording of hospitalisation. Further investigations are necessary to arrive at a more accurate estimate of the burden of hip fractures.

**Projections of vertebral and other fractures.**

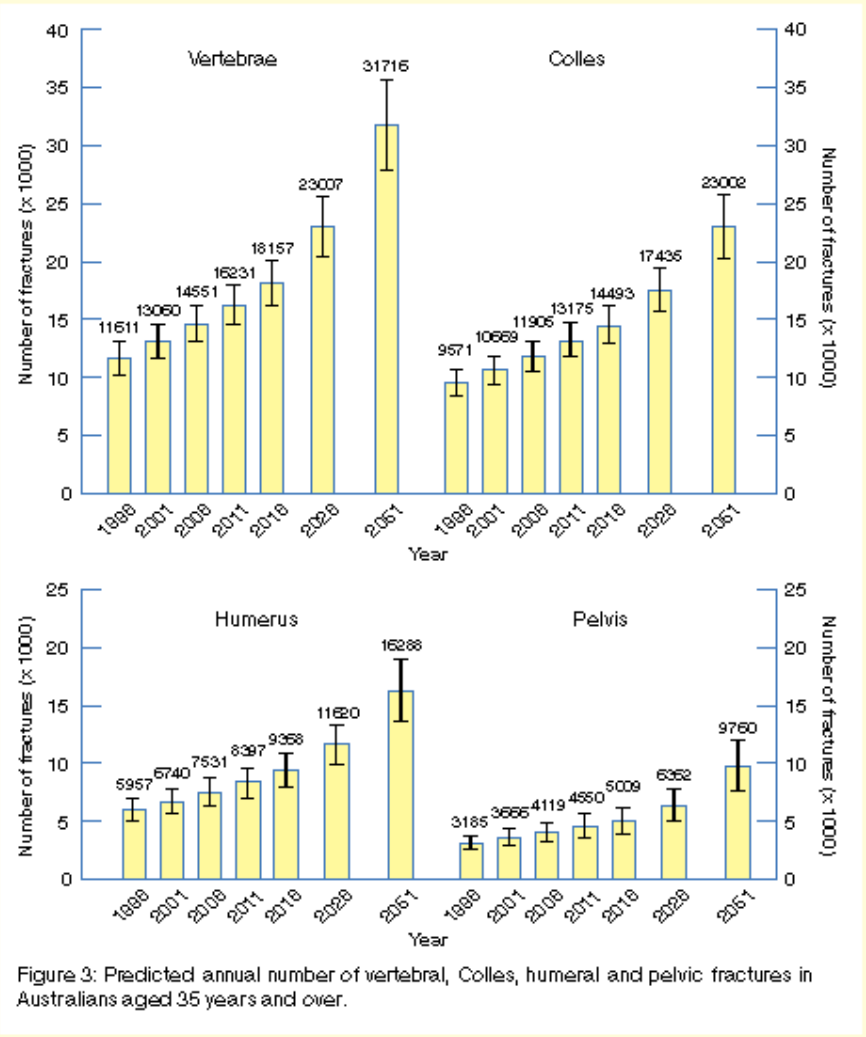



Figure 3: Predicted annual number of vertebral, Colles, humeral and pelvic fractures in Australians aged 35 years and over.

Source; Sanders et al.MJA1999[8]

Projections for vertebral, Colles, humeral and pelvic fractures (the most common sites of fracture after the hip) are shown in the figure above. Fractures at these sites are likely to increase more than fractures at other sites where fracture rates do not increase substantially with age. Population projections suggest that the number of vertebral, humeral and pelvic fractures will increase by 12% every five years until 2036, and then by 6% every five years until 2051(8). Colles fracture rates increase with age in women, but not in men, and the overall number of adults sustaining a Colles fracture will increase by 10% every 5 years until 2036, then by 5%every 5 years until 2051(8).

The majority of hip fractures are surgically treated except in frail and elderly who are at a high operative risk. Most vertebral fractures occur without symptoms. Almost 70% are clinically undetected (2).An observational study conducted by Center et al(12) found that in both women and men the mortality was increased in the first year after all major fractures including the proximal femur, vertebral and groupings of other major and minor fractures. However the increase in mortality after vertebral fracture was thought to be associated with silent vertebral fractures.

**Falls**

Majority of fractures particularly hip fractures result from falls in the older population. However when Osteoporosis is present, even minor traumas such as injury to the limb or simple falls can lead to fractures.

***Falls Statistics***

- Approximately 30% of older persons experience one or more falls per year (13).
- Falls are the leading cause of injury-related hospitalisation in persons aged 65 years and over, and account for 14% of emergency admissions (14) and 4% of all hospital admissions in this age group (15).
- Depending on the population studied 10-15% of older people suffer serious injuries from falls, 2-6% suffer fractures and 0.2-1.5% suffer hip fractures (13, 16).
- Over 90% of hip fractures involve a fall (17).
- Falls and fractures have some overlapping risk factors including poor vision, muscle weakness and poor balance (18).

***Falls Interventions***

Findings from 28 randomised controlled trials indicate that falls can be prevented in older people (13).

Some of the effective interventions which have been shown to reduce the incidence of falls include:

- High level balance exercise in group or home settings (functional balance exercises, Tai Chi, strength and balance training (17).
- Occupational therapy interventions in high risk populations (17).
- Expedited cataract surgery(19)
- Withdrawal of psychoactive medications(20)
- Multidisciplinary assessment of high risk populations (21,22)
- Comprehensive geriatric assessment in nursing homes ( 23,24)

Evidence-based interventions to prevent falls should be considered alongside treatment of osteoporosis as a routine strategy to prevent fractures.

## 3 Cost

The health expenditure for arthritis and musculoskeletal conditions is on the increase in real terms. Adjusting for health price inflation, health expenditure on these conditions in 1993–94 (in 2000–01 prices) was $3.4 billion. The estimated expenditure of $4.6 billion in 2000–01 for these conditions was an average annual increase of 4.3% over eight years.(2) In addition to population ageing and population growth, innovations in surgical techniques (greater uptake of hip and knee replacement procedures), pharmaceuticals ( costly prescription drugs) and biomedical devices have also contributed to the increase.

The three focus areas of osteoarthritis, rheumatoid arthritis and osteoporosis accounted for a total of $1.6 billion, or 35.6% of the overall expenditure for arthritis and musculoskeletal conditions. In 2000–01, an estimated $221 million was spent on osteoporosis, representing 4.8% of the total expenditure for arthritis and musculoskeletal conditions. (2) Post-fracture treatment and the ongoing need for care accounted for most of the osteoporosis costs.

In addition to the personal cost of this condition, osteoporosis also has significant health related costs of $1.9 billion per annum in direct costs, including treatment and rehabilitation costs.

**Arthritis and other musculoskeletal conditions accounted for 3.5% of all hospital separations (as principle diagnosis) in public hospitals, and 8.3% of all hospital separations (as principle diagnosis) in private hospitals in 2003-04 (2).**

**In comparison** with other National Health Priority Areas (NHPA), the expenditure on arthritis and musculoskeletal conditions is relatively high (25, 26). The seven NHPA's of cardiovascular health, cancer control, injury prevention and control, mental health, arthritis and musculoskeletal conditions, diabetes mellitus, and asthma, together accounted for $22.3 billion, or 44.4% of allocated health system expenditure in 2000–01.Of these, cardiovascular diseases were responsible for $5.5 billion and musculoskeletal conditions for a total of $4.6 billion. In comparison, diabetes and asthma cost $0.8 billion and $0.7 billion, respectively.

Of the total expenditure on musculoskeletal conditions in 2000-01, osteoarthritis accounted for 25% ($1.2 billion) of the expenditure, chronic back pain accounted for 12% ($567 million), disc prolapse accounted for 6% ($299 million), and rheumatoid arthritis and osteoporosis both accounted for 5% each ($246 million and $221 million respectively) (2). However this figure underestimates the contribution of osteoporosis towards the costs. The greatest proportion of expenditure for osteoporosis was on pharmaceutical treatment (35%). Prescription medications comprised 97% of this expenditure (2).

## 4 Awareness - Health Care Professionals

Osteoporosis accounted for only 0.6% of all problems managed by GPs (27). A large number of GP encounters in relation to Osteoporosis are for prescription medication only. More than 96% of those who visit their GP with osteoporosis are prescribed medication (AIHW arthritis series no 1 2005).

The level of recognition and treatment of osteoporosis is not well characterized in primary care. In the Australian Bone Care study of postmenopausal Australian women (>8,800) attending 927 primary care physicians, 29% reported one or more postmenopausal fracture and a great majority (72%) were not on any osteoporosis specific therapy, and only 40% were ever told they had osteoporosis (28). A New South Wales study on hip fracture admissions found that of the 142 patients who had a prior fracture only 18% of the women and 7% of men were on any osteoporosis therapy (29). Another New South Wales study that followed up 63 patients after a minimal trauma fracture found that only 16% had an effective anti osteoporotic therapy after the fracture (30) (See table below). Thus, despite both the magnitude of the problem and the introduction of osteoporosis treatment guidelines, most high-risk individuals (about 80%) are still not identified, and thus not treated. It may be reasonable to infer that many otherwise preventable fractures are occurring daily in Australia, as well as around the world (31).

| **Group Studied** | **Women with previous minimal trauma fracture receiving anti osteoporosis therapy** |
|---|---|
| Australian women with post menopausal fracture | <20% |
| NSW women with prior fracture history | 18% |
| NSW women with minimal trauma fracture | 16% |

Sources: Eisman et al (Journal of bone marrow research 2004)[28]; Port et al (Osteoporosis Int 2003)[29]; Wong et al (Int Med Journal 2003)[30]

A comprehensive survey (Osteoporosis Australia wide survey) which was conducted in Victoria looked into the recognition and treatment of osteoporotic fractures in individuals who present to the hospital with a fracture. The results of the survey showed that only 6% of patients admitted to SH (Southern Health) with a minimal trauma osteoporotic fracture received appropriate intervention. This was similar to results from around the country and highlights the need for urgent attention and improvement in this area.

A recent editorial (IMJ 2007) (32) highlights the evidence practice gap, which exists both in the hospitals and in general practice. Teede et al (33) conducted a retrospective audit of 1829 minimal trauma fracture cases presenting to 16 Australian public hospital Emergency Departments. Less than 13% had fracture risk factors identified, only 10% were appropriately

investigated and only 12% were started on treatment with calcium and/or Vitamin D. Specific anti-osteoporotic therapy was only given to 9% of the patients. Another study by Vaile et al (3) conducted in a tertiary referral hospital in Sydney showed that DXA (dual x-ray absorptiometry) was rarely performed. Only 20% of the patients had scan performed, fewer than 20% of patients were on any form of anti-osteoporotic therapy with <5% on bisphosphonates, 35% had a further fracture and 30% had died. These studies further confirm the presence of the "gap" and the urgent need to recognise and treat the condition in a timely and effective manner in order to reduce the fracture burden in Australia.

International studies show that doctors are failing to recognise osteoporosis as a cause of fractures and are not consistently offering appropriate treatment or referrals, despite the psychosocial and economic consequences of further fractures. It is estimated that 80 – 90% of patients with fragility fractures of the spine, forearm or hip remain uninvestigated and untreated. However, recent studies have shown that these high-risk individuals are not being diagnosed or treated. Among hospitalised women aged 60 or older with spine radiographs showing severe vertebral deformities, only 17% had mention of the fracture in their medical records or discharge summary (34). A study of women aged 55 years or more with wrist fractures in a managed-care setting reported that 23% had been started on some form of osteoporosis-specific therapy, and less than 3% had had a BMD scan (35). The situation for hip fracture is more disturbing. In a study of 502 hospitalised hip-fracture patients, only 14% had BMD scans, 13% received calcium and/or vitamin D, and only 18% received HRT, calcitonin, or bisphosphonates (36). Other studies have reported that only 5% of patients with recent hip fractures left the hospital with a new medication prescribed for reducing the risk of subsequent fractures (37,38).

These data support the need for more effective education for the community and medical practitioners' particularly general practitioners, orthopaedic surgeons and geriatricians of the clinical significance of osteoporotic fractures and to suggest preventive health behaviours such as increased calcium intake and regular exercise.

Allied health services are an integral component of the management of osteoporosis. According to the 2001 NHS, about 22% of people with osteoporosis had consulted an allied or other health professional within the previous two weeks of the survey. The allied or other health professionals most frequently consulted were chemists (6%), followed by physiotherapists/hydro therapists, chiropodists/podiatrists, chiropractors and nurses, each accounting for 3% of the consultations.

Many health professionals including endocrinologists, rheumatologists, geriatricians, general practitioners and allied health practitioners, such as physiotherapists, exercise physiologists and dietitians, are involved in the care of patients with osteoporosis. Currently, training in undergraduate and postgraduate curricula for osteoporosis is limited and this needs to be improved to a minimum nationwide standard in all fields of healthcare education".

**At present guidelines into the diagnosis, treatment and prevention of osteoporosis are being developed in conjunction with RACGP (Royal Australian College of General Practitioners) and NHMRC for medical and allied health professionals.**

## 5 Patient awareness

A survey which was conducted by Osteoporosis Australia and research based medicine company, Pfizer Australia revealed that only one in three Australians identified smoking as a risk factor even though it is one of the most important lifestyle factors that can affect bone mass. Additionally, 41% (compared to 55% of all Australians) do not recognise that not smoking would help to prevent Osteoporosis. Worryingly, the research found that 69 percent of men showed little or no concern about developing osteoporosis themselves and had a much lower understanding than women of the lifestyle factors that can affect its development. The survey also revealed that 48 percent of those polled were unaware that osteoporosis could be treated.

**Awareness of the public health implications of vitamin D deficiency and hence Osteoporosis in Australia has been increased by a recent editorial (39) and the Australian Scientific Position Statement. Recommendations from the Vitamin D and Calcium Forum held in Melbourne in 2005(40, 41) have also recently been published as guides intended for consumers as well as medical practitioners.**

As well, Osteoporosis Australia has produced a significant amount of education and awareness materials* (see below) since 2005. These programs have been supported by the Australian Government under the 7th National Health Priority area and in evaluation have significantly increased awareness and understanding of osteoporosis and fractures.

- Prevent the Next fracture, series of guides for consumers, GPs, pharmacists, health professionals.
- Vitamin D & Calcium Guides for consumers, GPs, Pharmacists.
- Bones & joints schools kit on CD rom that has gone out to all primary schools in Australia.
- National Fracture Card initiative
- Multicultural programs with translated fact sheets.

## 6 Loss of productivity and Quality of life.

OP is a major cause of both acute and chronic disability (42) People suffer the pain and disability of fracture that can lead to loss of independence and early admission to nursing homes. The severe pain following fracture may last a few weeks and may lead to long term activity limitation .A large number of people with fracture require long term care. The impact of osteoporotic fracture on the quality of life may be profound. Almost half of the people with hip fracture will be permanently disabled and not regain their independence About 40% of people are unable to walk independently one year after hip fracture, about 60% have difficulty with at least one essential activity of daily living, and about 80% are limited in activities such as driving and shopping.(43).

Chronic pain in the sufferers can also lead to marked psychological effects including anxiety and depression. Several studies have linked the relationship between pain and depression (44).

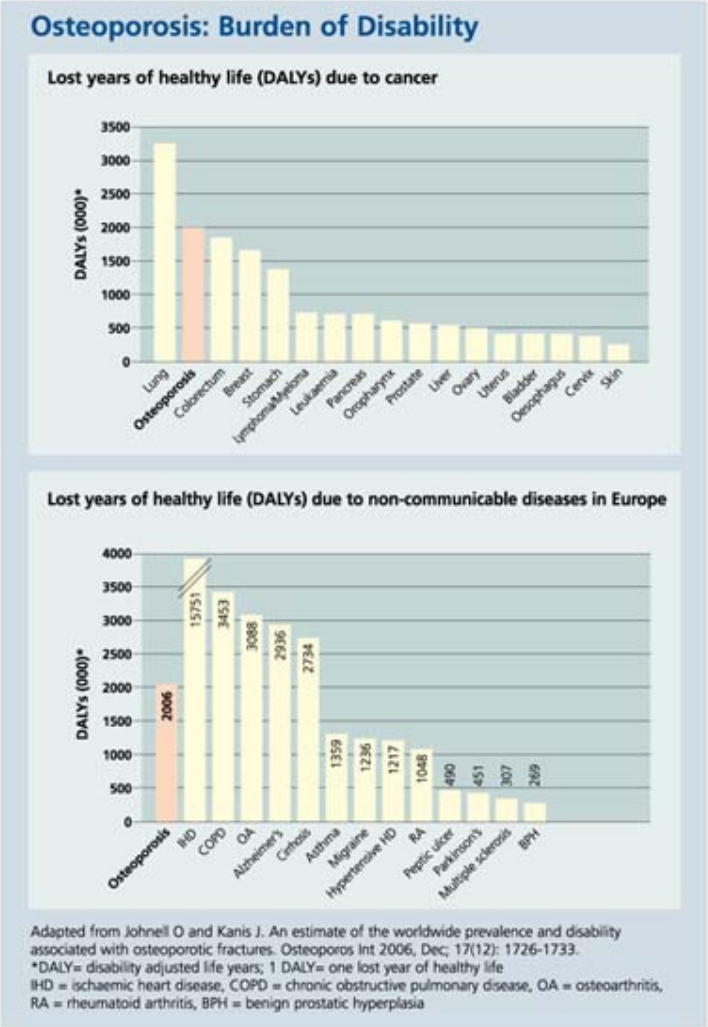
## 7 Osteoporosis as a significant Burden of Disease in Australia and worldwide

The ageing of Australian population is increasing the demand for health resources. Thus diseases such as osteoporosis are affecting a greater proportion of the population. Health expenditure per person aged 65 years and over is nearly four times higher than for younger individuals ( $4900 v $ 1300) (45).

The number of adults sustaining a hip fracture is likely to more than double from 15000 in 1996 to 34 000 in 2026, then almost double again by 2051. Fractures at other sites are expected to increase by 70% from 1996 to 2026, then by a further 26% to 2051. These rates of increase are far above the expected growth in total healthcare costs due to the ageing of the Australian population, which is estimated to be 4% every five years for the next 30 to 40 years (46).

In contrast to Europe and North America where numbers of hip fractures are expected to double by 2026 and then stabilise, in Australia hip fractures will continue to place a growing demand on health care resources for many years to come (8).

Worldwide osteoporotic fractures accounted for 83% of the global burden of non communicable disease and was 1.75% of the global burden in Europe (47). In Europe osteoporotic fractures accounted for more DALYs( disability adjusted life years) lost than common cancers including breast cancer, colon cancer, stomach cancer, and cancer of the prostate( the only exception was lung cancer), and also more DALYs lost than many other chronic diseases including asthma, migraine, hypertensive heart disease, rheumatoid arthritis ( See figure below). For chronic musculoskeletal disorders, the DALYs lost in Europe due to osteoporosis (2 million) were less than for OA (3.1 million) but greater than RA (1million). (47)




Adapted from Johnell O and Kanis J. An estimate of the worldwide prevalence and disability associated with osteoporotic fractures. Osteoporos Int 2006, Dec; 17(12): 1726-1733.
*DALY= disability adjusted life years; 1 DALY= one lost year of healthy life
IHD = ischaemic heart disease, COPD = chronic obstructive pulmonary disease, OA = osteoarthritis, RA = rheumatoid arthritis, BPH = benign prostatic hyperplasia

This analysis by Johnell et al (47) ( An estimate of the worldwide prevalence and disability associated with osteoporotic fractures), the first of its kind for osteoporosis, demonstrates that osteoporotic fractures are a significant cause of morbidity and mortality (particularly in the developed countries), and also shows that in terms of 'disease burden', osteoporosis outranks several other chronic diseases which are known to pose a significant burden, including many common cancers, rheumatoid arthritis and hypertensive heart disease. And, it certainly highlights the incongruity inherent in the health care agendas of many countries, which place osteoporosis low on the list of priorities. (47)

## 8 Government Policy

### 8.1 Recent Major Achievements

- In the 2006-2007 health budget the Australian government has committed continuing funding of $14.8 million over 4 years to the *Better Arthritis and Osteoporosis care* initiative. This initiative will be subject to review in 2010-2011 budget. ( Health Budget 2006-2007)
- From April 2007 the Government has provided a rebate for the prevention and investigation of osteoporosis. The drugs alendronate (Fosamax, Fosamax Plus and Alendro) and risedronate (Actonel, Actonel Combi) have been placed on the PBS list and bone densitometry by DXA test has been subsidised by Medicare. People aged 70 years or older with T-scores of -3 or less will benefit from this scheme. From November 2007, this PBS reimbursement will also apply to strontium ranelate (Protos) for women aged 70 years or older with T-scores of -3 or less**.**
- During 2003-2004 28 projects across Australia were funded under the National Arthritis and Musculoskeletal conditions Improvement Grants (NAMCIG) program, to improve care using innovative approaches at a local level.
- In November 2005, the Australian Health Ministers' Conference endorsed a National Service Improvement Framework which outlines best care practices for people with osteoarthritis, rheumatoid arthritis and osteoporosis. This document is being used by the Australian, state and territory governments and other stakeholders to guide activity and service improvement in this area.
- In 2005-06 11 projects had been funded nationally in a quality improvement program known as the Arthritis and Musculoskeletal Conditions Quality Improvement Program (AMQuIP). This program addresses key objectives of the National Action Plan for Osteoarthritis, Rheumatoid arthritis, and Osteoporosis 2004-2005.
- NHMRC has spent nearly $70 million on research into OP and related issues between 2000-2006.

### 8.2 Osteoporosis Australia Public Awareness Programs

A range of activities currently being undertaken under the Australian Government's *Better Arthritis and Osteoporosis Care* initiative include. (48)

- National Awareness-raising programs for osteoporosis – Prevent the Next Fracture Campaign ; national Vitamin D & Calcium education program
- Osteoporosis Multicultural Program that includes translated fact sheets in 5 community languages and a multicultural media campaign
- Clinical practice guidelines about these conditions and vitamin D and calcium, for health professionals and consumers
- Developing an undergraduate musculoskeletal curriculum for medical students
- An osteoporosis educational kit for all primary school children about maintaining healthy bones
- The launch of the National Centre for Monitoring Arthritis and Musculoskeletal Conditions and the report *Arthritis and Musculoskeletal condition in Australia 2005* in October 2005.

## 9 Important setbacks/problems

There is significant underestimation of the burden imposed by osteoporosis in Australia. Self reports of osteoporosis are more likely to be limited to its diagnosis following a fracture (2). It is not a painful condition and therefore not easily recognised but may predispose individuals to fractures and injuries that do result in pain, disability and mortality. There are no data on the incidence of this condition or even the musculoskeletal condition in general. Having a non fatal profile has led to a poor monitoring and surveillance system. There is also very little information about the visits to specialists and allied health care professionals. A recent editorial (32) identified an evidence therapy gap in osteoporosis. No single professional group takes responsibility for osteoporosis; it is spread amongst endocrinologists, rheumatologists, geriatricians and general practitioners. Another important issue is the lack of easy access to DXA scans in the rural and remote areas of Australia together with the lack of reimbursement for patients aged < 70 years of age
One of the major setbacks is the lack of information relating to the effectiveness and uptake of information from public health strategies. The most important problem however continues to be under recognition and under treatment of osteoporosis and unrealistic beliefs that lifestyle modification alone will prevent further fractures.

## 10 Actions

There is wide scope for improving therapeutic intervention to reduce the incidence of fracture and the associated morbidity, mortality and costs. In the aged care environment, for example, the implementation of simple, safe and effective measures such as vitamin D and calcium supplements could prevent many fractures. This treatment gap is particularly significant given that almost 40 per cent of hip fracture cases in Australia are admitted to hospital from this setting (49).Studies have shown that by using both systematic and multidisciplinary approaches including communication strategies with the health care professionals (GPs etc) have improved rates of treatment in the hospital setting. Innovative studies conducted both in Australia (First fracture project, Vaile et al) and overseas have proved both health and cost benefits of a nurse led approach (3).

A well designed system is needed for surveillance and monitoring to improve and guide the prevention and management of arthritis related conditions including osteoporosis. A strong framework is needed which covers not only the epidemiology of the disease but also encompasses the issues of the population's ability to benefit from various health interventions (2). A process is needed to inform the development, implementation, and evaluation of various policies and interventions.

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