Overview

With one of the biggest populations in the world and a large and growing elderly population, osteoporosis in China is a major public health burden. Osteoporosis is known to currently affect more than 69.4 million Chinese over age 50 and causes some 687,000 hip fractures in China each year. Morbidity and mortality from osteoporosis fractures is strikingly high. Yet the disease remains severely under-diagnosed in even the most high-risk patients who have already fractured. Vertebral fractures also carry a major burden to the Chinese community with the number of vertebral fracture patients expected to reach 36.7 million in 2020 although the true number may be much higher.

The cost of hip fractures is high in comparison to all other major diseases such as heart disease, breast cancer, prostate cancer and ovarian cancer.

With the support of IOF, the China Health Promotion Foundation launched its first White Paper on Osteoporosis in 2008 and supports immediate priorities for Government action on osteoporosis.

Epidemiology

China had a total population of 1.24 billion in 2000. This increased to 1.31 billion in 2006 and of this about 26.62% (350 million 176 and 174 million of women and men accordingly) are people above age of 502-3.

According to the sum of live birth annual rate (1.65-1.8) and age matched death rate, China will have a population of 1.43 billion and 1.38 billion respectively in 2020 and 20504. The number will reach its peak at 1.47 billion in 2030. It is expected that people over 50 will be 469 million and 571 million in 2020 and 2050 respectively5,6 (figure 2).

In the 2003-2006 survey of the China Ministry of Health, the prevalence of osteoporosis in the people age over 50 with lumbar or hip BMD T-score lower than -2.5 was 15.7% (men 8.8%, women 30.8%) which means that 69.4 million Chinese (15.3 and 54.1 million in men and women accordingly) above the age of 50 have osteoporosis. Many fractures however occur in patients with a T-score greater than -2.5, hence, it is important to take other risk factors into consideration, for example, family history, previous fracture and glucocorticoid use. Figure 3 shows the
expected increase of osteoporosis and low bone mass population to rise to 286.6 million in 2020 and 533.3 million in 2050.

**Figure 3** Osteoporosis and osteopenia in China

### Hip fracture

A total of 687,000 hip fractures were estimated to occur in the population over age 50 in China in 2006 (241,000 in men, 446,000 in women). A survey in Shanghai showed the incidence of osteoporotic fracture in 1990-1997 increased by 3.34 to 3.85%. It is expected that the number of hip fractures in people over age 50 will increase to 1,638,000 in 2020 and 5,908,000 in 2050. In cities, hip fractures are usually treated with surgery, while in rural areas (which comprise more than 60 percent of the total population), hip fractures are often treated at home.

### Vertebral fracture

In a 1995 survey, the prevalence of vertebral fracture in the population age over 50 was 15%. The prevalence in the population aged over 80 is 36-39%.

According to the survey, 1.8 million new vertebral fractures occurred in 2006. The number of vertebral fracture patients is expected to reach 36.7 million and 48.5 million in 2020 and 2050. The incidence is higher in women than in men.

In China, very few vertebral fractures are diagnosed. Only 20% of people with vertebral fracture over age 50 were diagnosed. Once diagnosed, most of the patients receive pain relieving treatment. Kyphoplasty is a recent introduction in China and is limited to the large cities. There is no general consensus on treatment of vertebral fractures. However, the risk of future fracture is significantly increased in this population hence they should receive prophylactic treatment in addition.

### Cost (hip fractures)

The average direct cost of hip fracture in 2007 was 3603 USD. According to the statistics of the Health Bureau of Chongqing and other cities in recent years, the cost of hip fracture increased at a rate of about 6% every year. It can be calculated that in 2020, the average costs of hip fracture will be 7600 USD. The treatment cost of hip fracture will be 44,000 USD in 2050.

In 2006, China spent about 1.5 billion USD treating hip fracture. In 2020, it will cost over 12.5 billion. In 2050, it will be more than 264.7 billion USD.

### Comparison of the cost of hip fracture with other disease

According to the State Health Department, the average hospital stay for hip fracture is 19-24 nights (breast cancer is 13 nights; ovarian cancer 11 nights; prostate cancer 19 nights; heart disease 10 nights). The average hospital fee for first hospitalization of hip fracture ranges from 2367 USD (average 3117 USD), that for breast cancer 2279 USD; ovarian cancer 2205 USD; prostate cancer 1941 USD; heart disease 2941 USD (figure 5).

**Figure 4** Vertebral fracture in women over 50

**Figure 5** Cost comparison of hip fracture and other diseases
Diagnostics

At present, there are 450 DXA machines and 1100 peripheral bone densitometry machines in China, which has a population of 1.3 billion. That means less than 0.35 DXA per million people. DXA machines are only available in urban centers, mainly on the southeastern coast, the more economically developed areas of the country. Beijing, with a population of 16.33 million, has 55 DXA machines, 3.4 DXA per million people, while Shanghai with 18.58 million people has 21 DXAs, 1.5 DXA per million people.

In other medium and small sized cities, QUS (Quantitative Ultrasonography) and other peripheral bone densitometry are widely used to diagnose osteoporosis. The waiting time for DXA scan is usually 1-2 days, ultrasound can usually be done on the same day. X-ray radiography is also used to diagnose osteoporosis, especially for vertebral fractures. However, lack of awareness of the medical professionals results in gross underdiagnosis of the problem.

The cost of both vertebral and hip DXA scan varies from 11.7 to 58.8 USD and the cost for ultrasound varies from 4.4 to 14.7 USD. The costs are determined by regional governments under the direction of the central government. Reimbursement policies are variable.

Lifestyle Prevention

Osteoporosis prevention and awareness is restricted to urban areas in China. According to a recent Urban Residents Survey of 56 630 people (12 332 men and 44 298 women), 57.2% of them had heard about osteoporosis.

In China, due to increased advertising on TV regarding milk and milk products, milk consumption by children and youth is increasing. Calcium and vitamin D fortified products are commonly available.

Treatment

Use of pharmaceutical therapies for osteoporosis varies markedly between urban and rural areas and from south to north of the country. Hormone replacement therapy (HRT), Selective Oestrogen Receptor Modulator (SERM), various bisphosphonates and calcitonin have been used for osteoporosis treatment for 5-10 years in urban areas, especially in large cities. Clinical trials with Teriparatide (PTH) and Strontium Ranelate have been completed and these have been approved by the government. The Traditional Chinese herbal formula Xianling Gubao (XLGB) is the most widely accepted by the people to prevent osteoporosis. It is also included in the reimbursement list of state health insurance. According to the insurance policies, some of the drugs are reimbursed only for severe osteoporosis patients. Most anti-osteoporosis drugs are only reimbursed for women.

Government Policies

So far, osteoporosis is not yet recognized as a major health problem by the Chinese government. The government and non-governmental organizations (NGOs) are gradually paying more attention to osteoporosis. More continuing medical education (CMEs) and seminars are being organized. At present, there are no government public awareness programs covering prevention, diagnosis and management of osteoporosis. But the government supports NGOs in activities such as Hand-in-Hand Osteoporosis Awareness Project, Silver Ribbon Osteoporosis Prevention Action, I LOVE MILK campaign.


At present, health professional training is carried out by academic societies with the support and approval of the Health Ministry, and there are no government guidelines for professional training.

So far, osteoporosis prevention and treatment is not included in medical college education. There are four national societies and foundations active in osteoporosis prevention. They are the China Health Promotion Foundation, Osteoporosis Committee of Chinese Gerontology Society, China Orthopaedic Society of CMA, Osteoporosis and Bone Mineral Society of CMA.

Setbacks/problems

Though osteoporosis prevention and treatment began in China more than 20 years ago, public awareness of this disease still needs to be raised. At present, all treatments, prevention and education efforts are limited to cities; people in rural areas have little knowledge about this disease.

1. Significant underestimation of the burden imposed by osteoporosis in China.
2. Under diagnosis and under treatment of osteoporosis.
3. Lack of funding to support professional training and public education programs.
Recommendations

1. Focusing on high-risk populations to prevent osteoporosis is our main recommendation. Followed by:
2. Increase in funding for basic and clinical research on osteoporosis and public education programs.
3. Establishment of professional training programs; inclusion of osteoporosis education material in the medical curriculum.
4. Improve diagnostic capabilities by equipping hospitals with DXA in the cities and affordable, mobile and easy-to-run diagnostic equipment in community health care.
5. Issue National Guidelines on Osteoporosis Diagnosis and Treatment.
6. Expand reimbursement items for osteoporosis treatment drugs for both men and women, and people with a prior fracture.

References

5. China Population Information and Research Center:www.cpirc.org.cn/est2.htm 2002-09-19