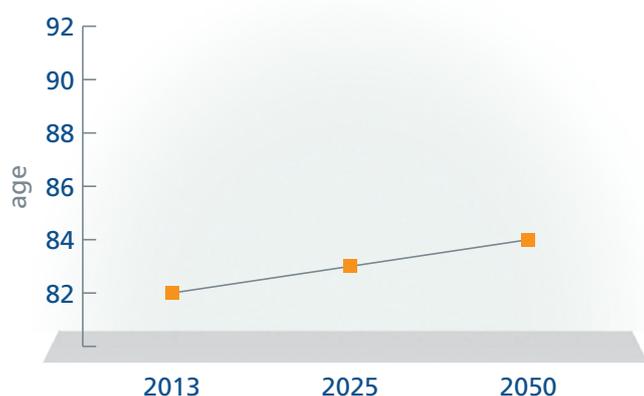


HONG KONG

COUNTRY OVERVIEW

In 2013, the population of Hong Kong was 7.18 million people with an average life expectancy of 82 years of age. Given the projected 2% increase, life expectancy will reach 84 years by 2050 (Figure 1). While the overall population is projected to decrease by approximately 14% by 2050 to 6.1 million, those aged over 50 years will increase by 28% and those over 70 years will increase by 165% (Figure 2). Currently close to 40% of the population is aged over 50 years. By 2025, half of the total population will be aged over 50 years and this figure will rise to 60% by 2050¹. These figures indicate a clear need for Hong Kong to invest in the health-care infrastructure for their elderly citizens, including those with osteoporosis and related fractures.

FIGURE 1 Life expectancy in Hong Kong



State of osteoporosis/osteopenia

While the last 50 years has seen a sharp increase in hip fractures in Hong Kong, studies over the past decade, including the Hong Kong Osteoporosis Study, are showing a reversal in this trend. Hong Kong is now experiencing a decrease in the incidence of age-adjusted hip fractures in women and men as well as a lower prevalence of osteoporosis and osteopenia². In the past decade, Cheung and colleagues found significantly higher bone mineral density (BMD) levels in women



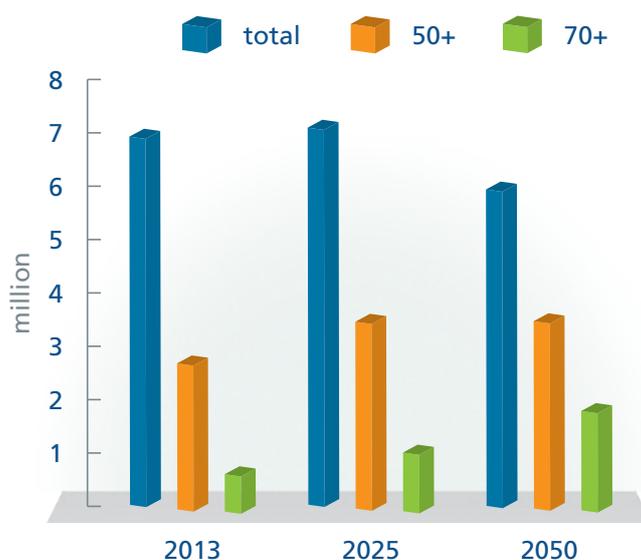
CURRENT

Population **7.18 million**
 Aged over 50 years **40%**
 Life expectancy **82 years**
 Hip fracture incidence per year **123/100,000**
 Cost per hip fracture **10,782 USD**
 Number of DXA per million population **20.7**
 Fracture liaison services **10–25%**

PROJECTED 2050

Population **6.1 million** ↓
 Aged over 50 years **60%** ↑
 Life expectancy **84 years** ↑

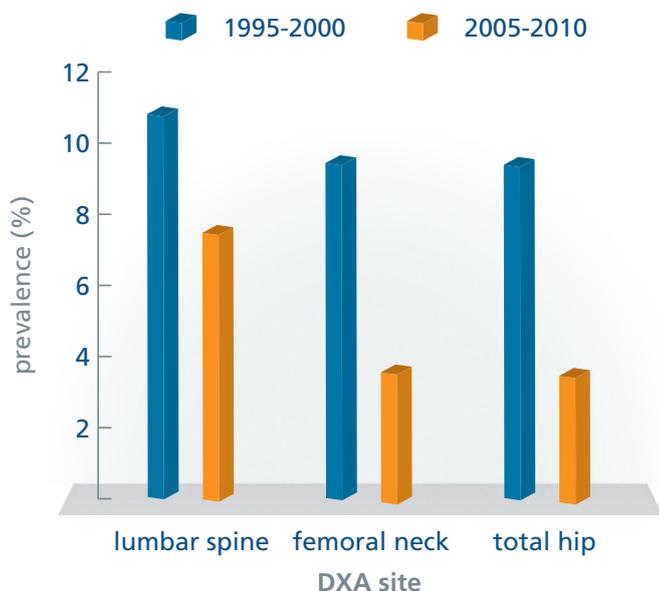
FIGURE 2 Population projection for Hong Kong



NOTE Statistics are from the U.S. Census Bureau and may be underestimated due to the regular influx of immigrants from Mainland China at a rate of approximately 150 per day.

aged over 50 years with BMD values increasing by approximately 9%. The same study indicated that the prevalence of osteoporosis was lower in 2005–2010 than it was in the previous study conducted in 1995–2000; respectively, the prevalence decreased from 11.2 to 7.8 % at the spine, from 9.7 to 3.7 % at the femoral neck, and from 9.6 to 3.6 % at the total hip² (Figure 3).

FIGURE 3 Percentage of subjects with osteoporosis in southern Chinese women recruited in 1995–2000 and 2005–2010²



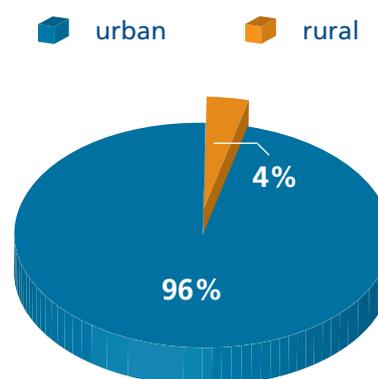
SOURCE Figure reproduced from Cheung E. et al. (2013). A secular increase in BMD in Chinese women.

Nevertheless, osteoporosis is a major and increasingly important public health issue in Hong Kong. Although the incidence of age-adjusted hip fractures seems to be decreasing over time and the prevalence of osteoporosis within Hong Kong is lower today than a decade ago, when compared to Caucasians, Hong Kong men and women still have a higher prevalence of osteoporosis and a lower BMD. One community-based study showed 35.8% of Hong Kong women have osteoporosis versus 20% of Caucasian women^{3,4}. Furthermore, the absolute number of age-related hip fractures continues to rise due to the ageing population⁴.

Lifestyle

According to Cheung and colleagues², the last decade in Hong Kong has seen bone health improvements such as increases in BMD and decreases in age-adjusted fractures because the people have been leading healthier lifestyles, have increased access to anti-osteoporosis drugs and have greater awareness of osteoporosis. This is good news; however the negative lifestyle habits that lead to increased risk of osteoporosis are still highly prevalent in Hong Kong. A sedentary lifestyle is common, with the average amount of outdoor exercise being around one hour per week. This leads to limited time in the sun and an increased risk of vitamin D deficiency. Additionally, studies reveal that calcium intake still remains low (approximately 400 mg/day) as it has over the past years². The urbanization of Hong Kong and the ageing population signifies that the burden of osteoporosis will remain a looming problem over the years to come (Figure 4). Adoption of a more “Western” lifestyle and its effects on osteoporosis are evident in Hong Kong with studies showing BMD to be lower and the hip fracture rate to be much higher than in Mainland China^{4,5,6}.

FIGURE 4 Urban versus rural population in Hong Kong⁷



Level of awareness

According to the Osteoporosis Hong Kong 2013 Guidelines, over the past decade there has been an increase in public awareness of osteoporosis. Hong Kong men and women are making better lifestyle choices in general, and at the district level there have been some official steps taken to improve community

awareness of fall prevention and exercise through Tai Chi classes. Prevention messages however may not be effectively reaching men. One study points out that Hong Kong men display a continued lack of interest in health-related activities in general – which increases their risk as they remain under informed about osteoporosis prevention or their own BMD status⁸. Further, the reported increase in public awareness of osteoporosis is not capturing the attention of policy makers since osteoporosis is not a national health priority and is not considered among the top 10 priority diseases by the Hong Kong Health Authority.

FRACTURE RATES

Hip fracture

Several studies indicate that hip fracture rates in both men and women in Hong Kong are lower than in Caucasians^{3,8,9}. One study of men aged over 50 in the Hong Kong Osteoporosis Study found the incidence of hip fracture to be 123/100,000 person years⁸. However, when compared to mainland China hip fracture rates in Hong Kong are much higher^{4,5}.

The past 10–15 years has generally seen a decline in age-adjusted hip fractures in Hong Kong^{2,4,8}. In the past, over a 50-year period, there was a 300% and 200% increase in the age-specific incidence of hip fracture in women and men aged over 50, respectively. More recently however, between 1995 and 2004, the Clinical Data Analysis and Reporting System of the Hospital Authority showed hip fracture incidence declining almost 50% in men and women in their fifties, but remaining stable for those aged 80 years and over – the age range at which most hip fractures still occur⁵.

The ageing population, however, will counterbalance the stabilization seen in hip fracture incidence and the absolute numbers of hip fractures are expected to see an *exponential increase*⁵. In 2009 there were an estimated 4,400 hip fracture surgeries. Using this figure, combined with the 2013 Osteoporosis Society of Hong Kong (OSHK) Guidelines' projection that the total number of hip fractures in the year 2015 will reach 7,642 (5,293 women and 2,349 men)⁵ we are looking at an approximate 70% increase in hip fractures over this 6-year period.

In Hong Kong, most hip fractures are treated surgically. As stated above, in 2009 there were an estimated 4,400

hip fracture surgeries in Hong Kong and of these 68% of the patients were operated within 2 days of admission. Unfortunately, the delay and/or cancellation of hip surgeries is high in Hong Kong hospitals due to perceptions that the elderly have a lower priority for surgery than the young and the fear that elderly patients may not be “fit for surgery”¹⁰. However, the Queen Mary Hospital System is working to improve the statistics. The recently implemented *geriatric hip fracture clinical pathway* increased the number of hip fracture patients operated on within 2 days to 86%. This *pathway* has improved overall hip fracture patient care at Queen Mary Hospital – and the hope is to extend it to other hospitals around Hong Kong¹⁰.

Other fragility fractures

Consistent with the data on hip fractures, many studies indicate that men and women in Hong Kong also have a lower fragility fracture rate, with the exception of vertebral fractures, than Caucasians⁸. Additionally, the past decade has seen a plateau in the age-adjusted fracture rate when compared to the previous 50 years where fractures increased two-fold^{2,8}. However, more studies are needed on the actual fracture rate as well as the prevalence of fragility fractures in Hong Kong, since one study in 2005 indicated 30.4% of men over 50 reported a fragility fracture, and another study in 2006 found only 6.6% had a history of fracture¹¹.

Vertebral fractures

While findings indicate that hip and other fragility fractures in Hong Kong are low, studies show that the prevalence of vertebral fractures are actually equal to if not higher than Caucasians counterparts, and are much higher than those in Mainland China⁵. A possible explanation may be due to the higher prevalence of osteoporosis found in men and women in Hong Kong, but a lower fall rate³. The Hong Kong Osteoporosis Study found the overall prevalence of vertebral fractures, as determined by a questionnaire gathering BMD and clinical risk factors, in postmenopausal women to be 22% (age 60–69 = 19%; age 70–79 = 44%; age >80 = 68%). As expected, vertebral fractures increased with age, clinical risk factors, and decreasing BMD¹². Another study, looking at the radiographic vertebral fractures using Genant's semiquantitative (SQ) scoring system, found that in those aged over 65 years the prevalence of vertebral fractures was 8.6% (5% for men and 12.1% for women)⁹. The Hong

Kong Osteoporosis Guidelines for 2013 used the methodology of vertebral height ratio reduction by three or more standard deviations (SDs) to estimate the prevalence of vertebral fracture and found that in men and women aged 70–79 years the prevalence was 30% in women and 17% in men.

COST OF FRACTURE

According to the Clinical Data Analysis & Reporting System (CDARS) of the Hospital Authority in Hong Kong, there have been approximately 4,500 cases of hip fracture every year amounting to 52 million USD in annual hospital expenditure. With the ageing of the Hong Kong population, despite the plateauing of the age-specific incidence of hip fracture, it is expected that the absolute number of cases of hip fracture will continue to rise in the next 10–20 years¹⁰.

Looking at direct hospital and rehabilitation costs, estimates from the OSHK indicate that treating hip fracture patients amounts to over 10 000 USD per fracture, with an average of 7 hospital bed days and 20 rehabilitation bed days (*Table 1*). On average, the cost of care of a hip fracture patient in acute hospital and rehabilitation is approximately 400 USD each day¹⁰.

TABLE 1 Hip fracture in Hong Kong

HOSPITAL COSTS PER HIP FRACTURE (USD)	AVERAGE HOSPITAL BED DAYS	SURGICALLY TREATED
\$10,782	ACUTE 7 REHAB 20	95%

FRACTURE REGISTRIES

There are no fracture registries in Hong Kong.

FRACTURE LIAISON SERVICES

It is estimated that approximately 10–25% of hospitals in Hong Kong have set up a fracture liaison service (FLS), which are coordinator-based, post-fracture systems of care aimed at decreasing secondary fractures.

SPECIALISTS RESPONSIBLE FOR OSTEOPOROSIS

According to the OSHK, osteoporosis is primarily managed by endocrinologists and orthopaedic surgeons. Other specialities that may also manage osteoporosis include:

- Family doctors
- Rheumatologists
- Gynaecologists
- Geriatricians
- Rehabilitation medicine physicians
- Internal medicine physicians

It is reported that osteoporosis is neither a recognized medical speciality in itself, nor a recognized component of specialized medical training.

GOVERNMENT POLICIES

Osteoporosis as a documented national health priority

In Hong Kong, osteoporosis is not officially documented as a national health priority. Osteoporosis has been a major public health problem in Hong Kong but has not received proportional attention from policy makers as compared to other chronic diseases such as diabetes, hypertension, cardiac and cerebrovascular disease or dementia. Currently there are no authoritative local reports on the prediction of the magnitude of osteoporosis. Despite the considerable case load (4,500 cases of hip fracture every year), osteoporosis and related hip fractures have not been listed among the top 10 priority diseases in the annual plan of the Hong Kong Health Authority.

Guidelines

Guidelines for the treatment of osteoporosis in Hong Kong have been available since 1998 with updates published in 2004 and 2013. The latest Guideline, ‘*2013 OSHK Guideline for Clinical Management of Postmenopausal Osteoporosis in Hong Kong*’, was formulated by a task group from the OSHK and was published in the *Hong Kong Medical Journal* in April 2013. These guidelines aim to provide guidance for practice by both primary care physicians and specialists in various fields who are interested in the care of osteoporosis patients⁵.

TABLE 2 Osteoporosis treatments and respective reimbursement in Hong Kong

	YES	NO	IF YES, WHAT % IS REIMBURSED?
Risedronate		x	
Alendronate	x		100 with prior fracture
Ibandronate		x	
Zoledronic acid	x		100 with prior fracture and intolerance to oral alendronate
Clodronate		x*	
Pamidronate		x*	
Raloxifene		x	
Bazedoxifene		x**	
Denosumab	x		100 with prior fracture and intolerance to oral alendronate
Strontium Ranelate	x		100 with prior fracture and intolerance to oral alendronate
Teriparatide		x	
PTH (1-84)		x**	
Vitamin D/Ca supplements	x		
Calcitonin	x		Only employed for pain treatment in acute vertebral fracture
Hormone Replacement Therapy	x		
Testosterone	x		
Alfacalcidol		x*	
Calcitriol		x*	

* not employed for treatment of osteoporosis ** information not available

The guidelines address fracture risk assessment and treatment including prior fracture, age, BMD, FRAX, smoking & drinking, family fracture history, use of corticosteroids and secondary causes of osteoporosis.

Due to the nature of the health-care system, the guidelines on osteoporosis are not always compatible with reimbursement policy because reimbursement for assessments (i.e. dual-energy X-ray absorptiometry (DXA)) in the public sector is limited to patients who have had a prior fracture, and in the private sector DXAs are self-financed by the patient.

Audit and quality indicator systems

Data not provided.

TREATMENT (REIMBURSEMENT OF MEDICATION)

The treatment of osteoporosis and osteoporotic fracture has been haphazard in both the public and private sectors depending on the interest of the respective clinicians. The prevalence of vitamin D insufficiency (25OHD level <75 nmol/L) has been reported to be as

high as 62.8% in community-dwelling Chinese adults aged 50 years and over. Yet, calcium and vitamin D supplements are not routinely prescribed to osteoporosis patients, nor are specific anti-osteoporosis drugs.

The OSHK reports that the national health system only reimburses treatment for osteoporosis in patients with prior history of fracture. In patients who fracture, oral alendronate is the first-line treatment, and if it is not tolerated second-line treatments include: zoledronic acid, strontium ranelate and denosumab. All other forms of treatments, as well as treatment in patients without history of fracture are not reimbursed and must be paid for by the patients themselves (*Table 2*).

DIAGNOSTICS

In Hong Kong, DXA is the recommended diagnostic tool for osteoporosis, and the use of ultrasound is not recommended. There are approximately 20.7 DXA¹³ machines per one million in general population, and the average waiting time for a scan has a wide variation in the public sector with a median of 9 months. There is no waiting time in the private sector. The cost of DXA

can range from approximately 40-120 USD and is free in the public sector. However, in both sectors, there are barriers to access: the public sector requires history of prior fracture for reimbursement and the private sector does not offer reimbursement (Table 3).

TABLE 3 Access to DXA and ultrasound in Hong Kong

	DXA	ULTRASOUND
Waiting time (d)	Wide variation in public sector (median 9 month) No waiting time in private	Not recommended
Cost (USD)	40 to 120	
Is it reimbursed?	Free in public sector	
Is reimbursement a barrier to access to treatment?	No	

RECOMMENDATIONS

Osteoporosis has long been a major public health problem in Hong Kong but has not received proportional attention from policy makers compared with other chronic diseases like diabetes, hypertension, heart or cerebrovascular diseases and dementia. There is a need for more epidemiological data regarding all aspects of osteoporosis in Hong Kong, notably osteoporotic fracture. At the hospital level, priority should be diverted to the establishment of an interdisciplinary, structured secondary fracture prevention programme across the territory to address the treatment gap that evidently exists. At the community level, the health authorities should play a leading role to address the importance of osteoporosis prevention and fall prevention through a large-scale territory-wide campaign targeting the young and old population, respectively. Last but not least, systematic data collection and analysis of cases of atypical femur fractures which appear to deter patients and clinicians from accepting bisphosphonate treatment need to be conducted.

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