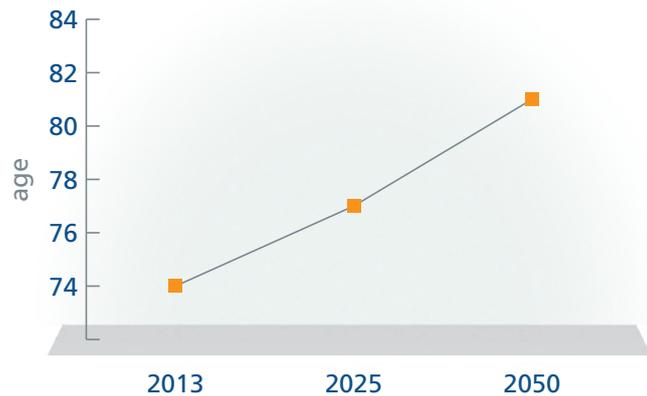


THAILAND

COUNTRY OVERVIEW

The population of Thailand, currently 67.4 million, is expected to increase by 5% to 70.6 million by 2025 and then taper off to approximately 69.6 million by 2050. Longevity is expected to increase by 9% from 74 years today to 81 years in 2050 (Figure 1). The population of those aged over 50 years, however, is projected to increase by 74% between 2013 and 2050, rising from 18.1 million to 31.5 million and will represent 45% of the population. Even more drastic is the predicted 216% increase in those aged over 70 years. This group totals 4.3 million today and will increase to 13.6 million by 2050 (Figure 2). Similar to the rest of Asia and elsewhere in the world, Thailand has an ageing population that will require a greater focus on osteoporosis and general healthcare over the coming years¹.

FIGURE 1 Life expectancy in Thailand



State of osteoporosis/osteopenia

It has been estimated that one-fifth of women aged between 40–80 years in Thailand have osteoporosis². As reported in the IOF Asian Audit of 2009, the most current estimation of osteoporosis prevalence in Thailand comes from the 2000-2001 nationwide survey which found that the prevalence of osteoporosis

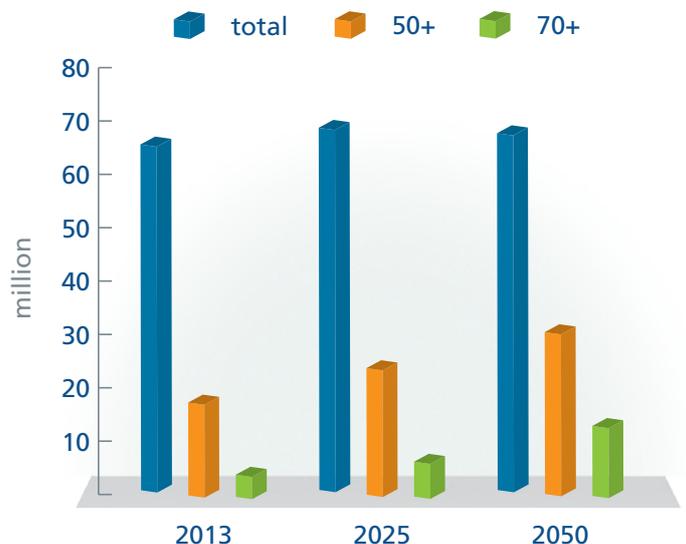
CURRENT

Population **67.4 million**
 Aged over 50 years **27%**
 Life expectancy **74 years**
 Hip fracture incidence per year **368/100,000** (women)
 Cost per hip fracture **2,064 USD**
 Number of DXA per million population **1.5**
 Fracture liaison services **not implemented**

PROJECTED 2050

Population **69.6 million** ↑
 Aged over 50 years **45%** ↑
 Life expectancy **81 years** ↑

FIGURE 2 Population projection for Thailand



in Thai women aged over 40 years was 13.6% at the femoral neck and 19.8% at the lumbar spine. The age-specific prevalence was shown to increase with age from 0.4%–1.7% at age 40–44 years, to more than 50% after 70 years of age³.

Lifestyle

One study showed that calcium intake was low (<400 mg/day) in almost all of the Thai postmenopausal women studied. The low dietary calcium levels were attributed to food limited in calcium and low consumption of milk due to it not being part of the traditional diet⁴.

A study of the Thai 4th National Health Examination Survey (2008–2009) found vitamin D insufficiency (low serum 25(OH)D levels) to be highly prevalent in the general adult population aged over 15 years. The severity varied throughout the country with the highest rate of vitamin D insufficiency found in the cities (threshold of 75 nmol/L). The overall prevalence of vitamin D insufficiency was 64.6% in Bangkok, 46.7% in other cities and 33% in rural areas⁵. Despite the abundance of sunshine, contributing factors may be limited outdoor sunshine exposure due to conservative dress, air pollution due to greater urbanization⁶ (Figure 3), and increased use of sunblock. Additionally, as seen in some other regions of the Asia-Pacific, vitamin D insufficiency in Thailand was very prevalent in young females, which raises concern about the future bone health of these women⁵.

Despite low calcium intake from non-dairy food sources and reports of high prevalence of vitamin D insufficiency, Thai women have lower fracture rates and few reports

of osteomalacia when compared to their Caucasian counterparts who consume more dairy products and have lower prevalence of vitamin D insufficiency. Interestingly, one study of the traditional diet in the north-eastern part of Thailand found that insect-derived foods are a rich source of calcium though their bioavailability is untested.

Level of awareness

It can be inferred from the literature that there is moderate awareness of osteoporosis among the medical community in Thailand. But it is clear that the diagnosis and treatment of this disease is not a priority amongst government officials and administrators of Thailand's national health insurance. Although guidelines on osteoporosis treatment have been published, the very limited access to diagnostic scans and low levels of reimbursement for treatment are inhibiting factors that restrict the general population's access to timely management of this silent disease.

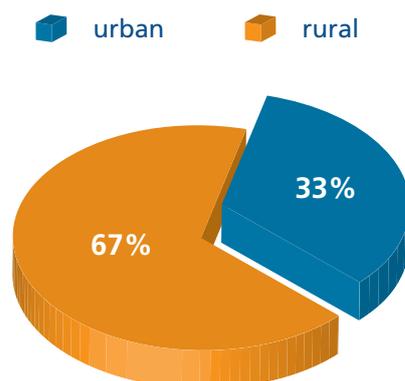
Nevertheless, osteoporosis is a preventable condition and the Thai Osteoporosis Foundation (TOPF) has devoted efforts to creating public prevention campaigns. These highlight the need for appropriate exercise programmes, adequate calcium intake (particularly from food sources), and exposure to sufficient sunlight for vitamin D production. Guidelines for screening of those who have clinical risk factors for osteoporosis and fracture have been developed and distributed. The health authorities, in cooperation with various specialty societies and the TOPF, have been trying to reach a consensus on recommendations to treat osteoporosis cost-effectively and within the available budget, appropriate for the national gross domestic product (GDP).

FRACTURE RATES

Hip fracture

A 2006–2007 hip fracture survey in Chiangmai, the northern capital of Thailand, found the age adjusted incidence of hip fracture in women aged over 50 years was 368/100,000 and in men was 136/100,000⁷. Compared to a similar study in 1997, the incidence of hip fracture in all men and women aged over 50 years increased by an average of 2% per year. In women aged over 50 years in particular, hip fractures increased 27% from 289/100,000 per year in 1997 to 368/100,000 per year in 2006. The 2006–2007 incidence of hip fracture was also shown to increase with age, from 26/100,000

FIGURE 3 Urban versus rural population in Thailand



per year in women aged 50–54 years to 1,407/100,000 per year in women older than 84 years of age⁷.

Death after hip fracture is a concern in Thailand. The mortality rate post hip fracture was 2.1% during hospitalization, increasing to 17% during the first year, with men at an increased risk of dying compared to women³. Studies show that Thai patients who do not receive surgery have almost double the risk of dying post hip fracture. This is a problem in Thailand because only 53% of hip fracture patients are treated surgically. For those who do have surgery, there is a 1–2 day waiting period³.

As reflected by the grim statistics earlier, most fracture patients are still not being identified and treated for osteoporosis in Thailand. The literature indicates that less than 1% of hip fracture patients receive bone mineral density (BMD) measurements and only 7% of hip fracture patients were diagnosed as osteoporotic. Moreover, less than 50% of patients received treatment for osteoporosis, such as calcium, vitamin D and/or antiresorptive agents³.

Other fragility fractures

Data not provided.

Vertebral fractures

While information is not available about the prevalence or incidence of fragility fractures in general, it has been reported that the incidence of vertebral fractures in men and women aged over 50 years evaluated morphometrically between 1997 and 2002 was 32.1/1000 in women and 54.5/1000 in men. Interestingly, the incidence in men was found to be higher than in women with the possible explanation that many of the male fractures could be trauma-related, attributed to the physical working environment that is more likely to suit men, rather than osteoporosis-related fractures⁸.

COST OF FRACTURE

The median total cost of treating each hip fracture in Thailand is 3,645 USD (116,459 THB)³. According to the TOPF, the direct hospital costs are approximately 2,064 USD (65,941 THB). The average number of bed days a patient spends in the hospital is approximately 20.6 (Table 1).

TABLE 1 Hip fracture costs in Thailand

DIRECT HOSPITAL COSTS PER CASE (USD)	INDIRECT HOSPITAL COSTS PER CASE (USD)	AVERAGE HOSPITAL BED DAYS
\$2,064	\$1,951	20.6

FRACTURE REGISTRIES

Thailand does not presently have fracture registries.

FRACTURE LIAISON SERVICES

The hospitals in Thailand have not implemented fracture liaison services.

SPECIALISTS RESPONSIBLE FOR OSTEOPOROSIS

Management of osteoporosis is devolved to specialty physicians and is included in the medical training for endocrinologists, orthopaedics, gynaecologists, rehabilitation physicians and internal medicine physicians. In some cases and hospitals, osteoporosis is recognized as a medical speciality in itself. Other physicians who also look after osteoporosis patients are rheumatologists and geriatricians.

GOVERNMENT POLICIES

Osteoporosis as a documented national health priority

Osteoporosis is not yet documented as a national health priority in Thailand. Though the problem of osteoporosis and fractures is looming large over Thai society, it is not yet considered to be a high on the list of health priorities. This may be due to the disease's silent nature and the fact that fracture incidence is not felt to be high in a country of women with life expectancy of 75 years. With the foreseeable consequences of osteoporotic fractures, the TOPF has issued several guidelines successively to reflect the updated information. The latest guidelines are currently being used nationwide, and the health authorities are looking for an appropriate solution to follow the practice recommendations under the limited budget.

Guidelines

The *Clinical Practice Guideline for Osteoporosis 2010* was published by the TOPF and Royal College of Orthopaedics of Thailand⁹. The guidelines cover osteoporosis in postmenopausal women, glucocorticoid-induced osteoporosis and osteoporosis in men. They provide screening guidance for patients who have indications for osteoporosis or osteoporotic fractures, and the guidelines address fracture risk assessment including evaluation of prior fracture status, age, BMD, and FRAX score. The guidelines are not always compatible with Thailand's reimbursement policy since osteoporosis treatment and drugs are not included in the national health insurance reimbursement policies.

Audit and quality indicator systems

Thailand does not currently have any quality or audit indicators in place tracking the care of osteoporosis patients.

TREATMENT

Thailand has a national health system covering health-care costs for its population; however the national essential list of reimbursable items does not include osteoporosis drugs, diagnostics and treatment to be automatically reimbursed, with the exception of calcium, vitamin D, hormone replacement therapy and testosterone. This situation is unlikely to change in the near future since a recent study determined that osteoporosis screening and treatment are not cost effective and should not be included in the public health benefit packages. This may result in many Thai osteoporosis patients foregoing diagnosis and treatment².

In some cases it is possible to receive reimbursement if the physician writes to the government giving clear indications and need for treatment, after which, if approved, the patients will continue to be monitored and treated by their physician without the need for additional justifications to the government. Due to this policy, physicians cannot always prescribe what they would normally recommend for their osteoporotic patients.

While anti-osteoporosis drugs are not included in Thailand's National List of Essential Medications, first-line treatments that physicians generally prescribe are: alendronate, which is the most prescribed medication (39%), followed by raloxifene (26%), nasal calcitonin

(13%) and risedronate (2%)². Again, these must be documented with clear indications for reimbursement, but most Thai patients end up paying for the medications out of pocket, if they choose to receive the treatment at all (*Table 2*).

DIAGNOSTICS

There is limited availability to access either dual-energy x-ray absorptiometry (DXA) or ultrasound for the diagnoses of osteoporosis in Thailand, and neither is offered under the public health insurance scheme². Further, according to a 2006 survey there are only 50 DXA machines available in the entire country so access is very limited³ (an approximate density of 1.5 machines

TABLE 2 Treatments available in Thailand and reimbursement levels

	YES	NO	IF YES, % REIMBURSED
Risedronate		x	
Alendronate		x	
Ibandronate		x	
Zoledronic acid		x	
Clodronate		x	
Pamidronate		x	
Raloxifene		x*	
Bazedoxifene		x	
Denosumab		x	
Strontium Ranelate		x*	
Teriparatide		x*	
PTH (1-84)		x	
Vitamin D/Ca supplements	x		100%
Calcitonin		x**	
Hormone Replacement Therapy	x		100%
Testosterone	x		100%
Alfacalcidol		x	
Calcitriol		x	

* may be reimbursed by government with physician documentation of the indications for treatment

** withdrawn as osteoporosis treatment

per one million of the population¹⁰). For those who do receive diagnostic care, reimbursement is not guaranteed since patients must have indications for reimbursement as documented by the physician and determined by the government. When accessed, waiting time for a DXA scan is under 7 days and costs from 70–140 USD depending on the body site scanned. Ultrasound can be accessed immediately and costs around 17 USD (Table 3).

TABLE 3 Diagnostics access and cost in Thailand

	DXA	ULTRASOUND
Waiting time (d)	0-7	immediately
Cost (USD)	70 for one site 140 for LS and hip	17
Is it reimbursed?	yes, if patient has indications	yes, if patient has indications
Is reimbursement a barrier to access to treatment?	yes	yes

A FRAX model calibrated for Thailand is available for fracture risk assessment as is the Osteoporosis Self-Assessment Tool (OSTA) which is validated for the Asian population². Furthermore, DXA-derived T score criteria and FRAX derived 10-year fracture probability treatment thresholds have yet to be clarified for the Thai population and validated in terms of clinical utility and cost-effectiveness.

RECOMMENDATIONS

At present, approximately 80–90% of individuals at high risk for osteoporosis are not identified or treated. From both clinical and economic perspectives, aggressive measures to detect osteoporosis in its early stage are warranted. This reality calls for major steps, including operational research and identification of risk factors, to remove barriers and to seek more effective preventive measures³.

REFERENCES

1. United States Census Bureau 2013, Census.Gov, viewed 01 September 2013, <<http://www.census.gov/population/international/data/idb/informationGateway.php>>
2. Kingkaew, P, Maleewong, U, Ngarmukos, C & Teerawattananon, Y 2012, 'Evidence to Inform Decision Makers in Thailand: A Cost-Effectiveness Analysis of Screening and Treatment Strategies for Postmenopausal Osteoporosis', *Value in Health*, vol. 15, pp. 520-528.
3. Pongchaiyakul, C, Songpattanasilp, T & Tacchakraichana, N 2008, 'Burden of osteoporosis in Thailand', *J Med Assoc Thai*, vol. 91, pp. 261-267.
4. Rajatanavin, R, Chailurkit, L, Saetung, S, Thakkinstian, A & Nimitphong, H 2013, 'The efficacy of calcium supplementation alone in elderly Thai women over a 2-year period: a randomized controlled trial', *Osteoporos Int*, [Epub ahead of print].
5. Chailurkit, LO, Aekplakorn, W & Ongphiphadhanakul, B 2011, 'Regional variation and determinants of vitamin D status in sunshine-abundant Thailand', *BMC Public Health*, vol. 11, p. 853.
6. *Rural Population (% Of Total Population) In Thailand 2013*, Trading Economics, viewed 01 September 2013, <<http://www.tradingeconomics.com/thailand/rural-population-percent-of-total-population-wb-data.html>>.
7. Wongtriratanachai, P, Luevitonvechkij, S, Songpatanasilp, T, Sribunditkul, S, Leerapun, T, Phadungkiat, S & Rojanasthien, S 2013, 'Increasing incidence of hip fracture in Chiang Mai, Thailand', *Journal of Clinical Densitometry*, vol. 16, no. 3, pp. 347-352.
8. Jitapunkul, S, Thamarpirat, J, Chaiwanichsiri, D & Boonhong, J 2008, 'Incidence of vertebral fractures in Thai women and men: A prospective population based Study', *Geriatric Gerontology International*, vol. 28, pp. 251-258.
9. 2010 'Royal College of Orthopaedic Surgeons of Thailand and Thai Osteoporosis Foundation', Clinical practice guideline for osteoporosis.
10. *Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat*, World Population Prospects: The 2008 Revision, viewed March 28, 2011, <<http://esa.un.org/unpp>>: Kanis, JA, data on file.