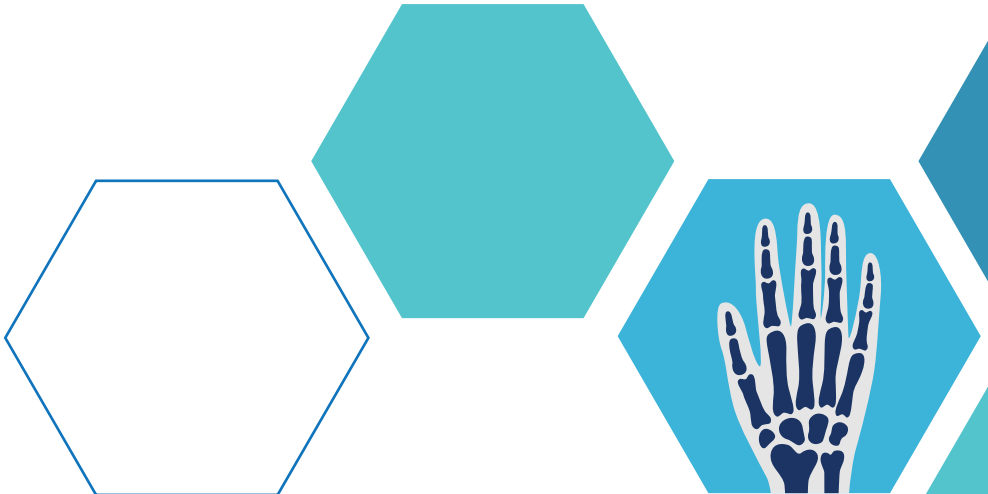
SOLUTIONS FOR FRACTURE PREVENTION

IN THE KINGDOM OF SAUDI ARABIA



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Report compiled by the International Osteoporosis Foundation (IOF) under the umbrella of Capture the Fracture® initiative (CTF), in collaboration with Kingdom of Saudi Arabia bone health experts.

IOF CAPTURE the FRACTURE

IOF International Osteoporosis Foundation

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SUMMARY

This document provides an assessment of the current policy and post-fracture care landscape in the Kingdom of Saudi Arabia, and provides recommendations which are aligned to the needs and opportunities identified by the Capture the Fracture® Partnership in cooperation with a panel of experts from the Kingdom of Saudi Arabia.

This document aims to:

SECTION 1 - A Problem on the Rise

Summarize the increasing burden of fragility fractures in the Kingdom of Saudi Arabia

SECTION 2 - Successes and Missed Opportunities

Map out successful (post-fracture care) initiatives in the Kingdom of Saudi Arabia, and identify current areas for improvement

SECTION 3 - Solutions Exist: Policy Recommendations

Provide health policy recommendations to address the burden of osteoporosis and fragility fractures and drive their implementation

SECTION 4 - Build your Response

Support local stakeholders in prioritizing osteoporosis and fragility fractures

Key Messages

The increasing burden of osteoporosis, treatment gap and importance of secondary fracture prevention

a. **Fragility fractures are a major public health concern in the Kingdom of Saudi Arabia** and are associated with a substantial (and escalating) health and financial burden. In 2019, approximately 175,000 fragility fractures occurred with associated osteoporosis-related costs of $635 million (USD). With a rapidly increasing older adult population and no change in policy, the number of fragility fractures is expected to increase by more than 25% between 2019 and 2023.

b. **Osteoporosis remains largely underdiagnosed and undertreated.** Despite the existence of safe and effective medications, and improvements in proportion of Saudi Arabian patients treated for osteoporosis, poor and suboptimal treatment initiation remains marked in high-risk patients with some studies reporting that less than 10% of patients currently receive effective secondary fracture prevention after an initial fragility fracture, despite this population being the most likely to sustain a further fracture.

c. **The Saudi Arabian population is underserved with Post Fracture Care (PFC) services.** Despite the recognized benefits of FLS (a model of Post Fracture Care) in reducing the risk of fractures, only a few Saudi Arabian hospitals have an FLS. This represents a substantial missed opportunity, as it is a well-known fact that those who have had one fracture are vastly more likely to have another, and that targeting treatment in this group (using FLS) is a viable, and high-yield place to start.

Key Recommendations

Although several initiatives are already in place and need to be reinforced, specific recommendations include:

1. **Develop a common voice for osteoporosis**

2. **Raise the importance of fragility fracture prevention and therapy**

3. **Promote coordination of care and establish clinical pathways between primary and secondary care**

4. **Increase public awareness for osteoporosis**

5. Plan further FLS to increase post-fracture screening, diagnosis and treatment rates

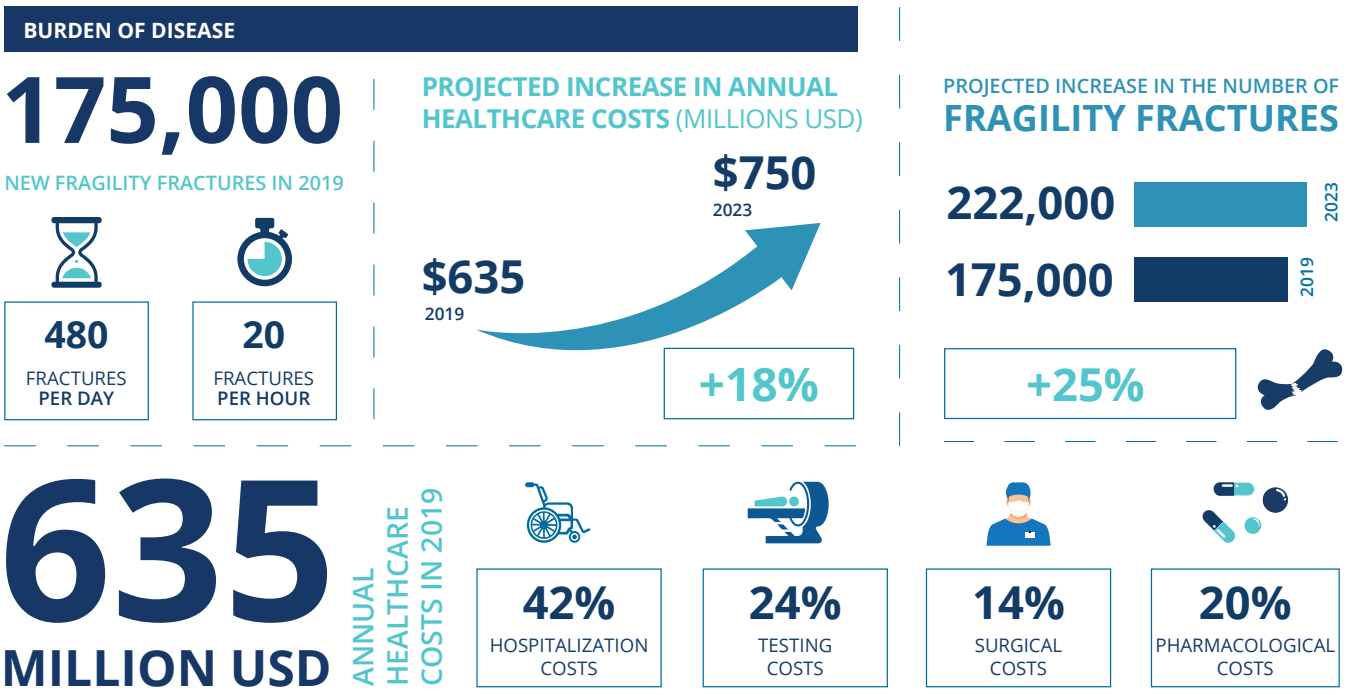
6. Create registries and databases to collect data on the incidence and consequences of fractures

A PROBLEM ON THE RISE

Osteoporosis is a disease that makes bones weak and fragile. This greatly increases the risk of breaking a bone even after a minor fall. The disease has no obvious symptoms and so many people are unaware that they have osteoporosis until they suffer a fracture.

These osteoporotic 'fragility fractures' are common, particularly in older adults. Indeed, fragility fractures are increasing in prevalence, can be life-altering (causing pain, disability and loss of independence), and are associated with a substantial direct and indirect financial burden. Figure 1 summarizes key data regarding the burden of osteoporosis and fractures in the Kingdom of Saudi Arabia.

Figure 1
Burden of osteoporosis-related fractures in the Kingdom of Saudi Arabia (data from Aziziyeh, 2020)

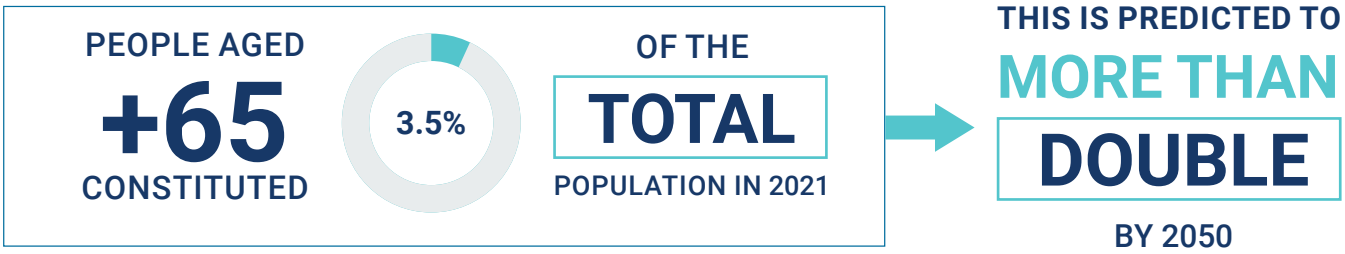


Population ageing

An increasing ageing population. In 2022, the population of the Kingdom of Saudi Arabia was about 35 million, a number expected to increase to 45 million by 2050. At birth, the average life expectancy for both sexes are about 75 years, but this is expected to increase with the expansion of the elderly population.

This shift in demographics **will markedly increase** the incidence and societal burden of fragility fractures occurring in the population. Fragility fractures are a substantial public health issue.

The proportion of elderly individuals in the population is rapidly increasing. In 2021, those aged 65 years and above constituted only 3.5% of the total population. This proportion is predicted to more than double to 7-8% by 2050.



Fractures are common

Fragility fractures are a substantial public health issue. In 2019, approximately 175,000 fractures occurred in the Kingdom of Saudi Arabia (approximately 20 fractures per hour). The number of hip fractures (the most serious fracture type) was estimated at 17,500.

Osteoporosis affects women and men. The prevalence of osteoporosis is estimated at 34% in women and 31% men aged over 50 years. A recent study at the King Fahd Hospital revealed that the prevalence of osteoporosis among patients who underwent DXA is substantial affecting 64% of men, and 58% of women.

The Kingdom of Saudi Arabia has one of the highest expected accelerations of fracture rates globally. From 2019 to 2023, the number of fractures is expected to increase by 25%. Furthermore, assuming no change in the age- and sex-specific incidence, another study revealed that the number of hip fractures is expected to increase almost sevenfold between 2015 and 2050.

Re-fractures are on the rise. Fragility fractures double the risk of sustaining a new fracture, with even higher increased risk in the first 24 months following a fracture.

Fragility fractures are associated with increased death. The 1-year mortality rate associated with hip fractures in the Kingdom of Saudi Arabia is 27% which is markedly higher than the regional average of 18% reported in epidemiological literature.

Fragility fractures cause pain, disability, loss of independence, and have a significant impact on quality of life. A Saudi-Arabian study reported that only 48% of patients with hip fractures were able to return to their pre-fracture activity status; 32% of patients required walking assistance and 83% of those who required a wheelchair became bedridden.

Financial impact

Fragility fractures are costly to the healthcare system. In 2019, the total burden of osteoporosis-related fractures was estimated at $635 million (USD), including about $267 million for hospital; $151 million for testing; $86 million for surgical cost; and $131 million for prescription drugs. When accounting for the population size, the average economic burden per 1,000 at risk over that same year was $121,000 (USD).

635 MILLION USD ANNUAL HEALTHCARE COSTS IN 2019

$267 MILLION HOSPITALIZATION COSTS

$151 MILLION TESTING COSTS

$86 MILLION SURGICAL COSTS

$131 MILLION PHARMACOLOGICAL COSTS

High cost of a fracture. The incremental total mean direct medical costs for patients with an osteoporotic fracture was recently estimated at about $9,000 (USD).

The financial burden will rise. Due to the ageing population and increasing number of fractures, the total cost of fractures is predicted to increase drastically in the future.

Fragility fractures affect national finances both directly and indirectly through fractures in the workforce and the additional care required from family and relatives of working age. An historical simulation study suggested that the indirect costs of fractures could be three times higher than the direct costs.

SUCCESSES AND MISSED OPPORTUNITIES

We have identified positive initiatives for reinforcement and missed opportunities which need to be taken.

Positive initiatives that need to be to be built upon

The **Saudi Arabian** government has acknowledged that action is required to improve fragility fracture recognition, treatment and long-term fracture prevention, but they are unsure how to approach it.

In 2018, the **National Plan for Osteoporosis Prevention and Management** in the Kingdom of Saudi Arabia was published by the Ministry of Health. This document made recommendations and outlined areas for improvement, but despite this plan there were difficulties in implementing it partly because of a mismatch of skilled personnel dealing with the diagnosis and therapy of fragility fracture patients.

Recommendations for the prevention, diagnosis, and treatment of osteoporosis are available in the Kingdom of Saudi Arabia. In 2015, the Saudi Osteoporosis Society (SOS) convened a panel of experts who performed an extensive review of published studies to formulate recommendations. An update to these recommendations has been published. The update was published in the Archives of Osteoporosis in 2023.

Some organizations have set up their **own fragility fracture pathways,** such as Al-Noor Specialized Hospital Mecca, King Fahd Hospital, King Khalid University Hospital, Riyadh and Almouwasat Hospital in Dammam.

Reimbursement policies are favourable and allow patients who are aware of their osteoporosis to access treatment.

Coalitions are being built. Coalitions unite existing international and national societies for example via the International Osteoporosis Foundation (IOF) Mentorship Programme which partners experienced FLS with newly formed services. Furthermore, two FLS Workshop of the Saudi Osteoporosis Society were held in collaboration with the International Osteoporosis Foundation and Capture the Fracture® in 2020 and 2021. Four major barriers to adopting FLS were identified in the workshop from 2020: availability of the Capture the Fracture® tool, user experience, data privacy and budget impact.

The IOF Best Practice Framework application platform has been **translated in Arabic.**

A **FRAX® model** estimating 10-year probability of a fracture has recently been created for the Kingdom of Saudi Arabia.

Several **organizations contribute to disseminating knowledge** about osteoporosis and osteoporotic fractures, including the Saudi Osteoporosis Society, the Saudi Orthopaedic Association, the Saudi Spine Society, the Saudi Society for Endocrinology and Metabolism and the Saudi Rheumatology Society.

Gaps and missed opportunities

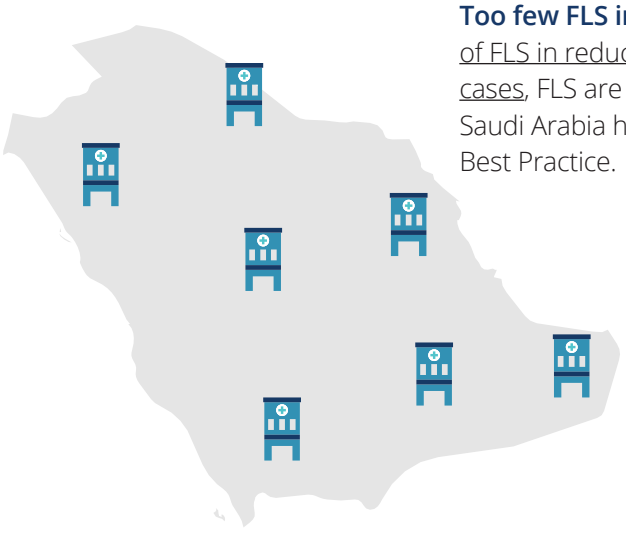
Low bone density and osteoporosis are not considered a high priority in the Kingdom of Saudi Arabia. Although recognized as a global health concern and as a chronic disease in the Kingdom of Saudi Arabia, osteoporosis has not been prioritized in the forthcoming Saudi Health Council plan, despite high prevalence and a predicted increase in future years.

A previous report highlighted that primary care physicians did not oversee the principal care of patients with osteoporosis. Osteoporosis is considered as a medical sub speciality and more emphasis should be placed on training residents/fellows and creating fellowship programmes to advance osteoporosis education in healthcare professionals. This should be performed in consort with the creation of robust partnerships between general practitioners and secondary care.

Vitamin D deficiency. Studies from the Kingdom of Saudi Arabia found that up to 80% of men and women over 50 years of age are vitamin D deficient. However, recent studies have suggested that the prevalence of vitamin D deficiency could be decreasing in some parts of the Kingdom.

Presently, there are **no national fracture registries** in the Kingdom of Saudi Arabia and hip fracture incidence is mainly on regional samples.

Too few FLS initiatives are currently operational. Despite the benefits of FLS in reducing the risk of fractures and the resultant cost-saving in most cases, FLS are limited in the Kingdom of Saudi Arabia. In September 2023, Saudi Arabia had only 11 FLS running and mapped on the CTF Map of Best Practice.



DXA availability remains limited. At the time of the 2011 Middle East and Africa IOF Audit, the number of DXA machines per million persons in the Kingdom of Saudi Arabia was only 5, substantially lower than other countries in the region. The availability of DXA has already increased but further efforts are required to accommodate the expected increase in the elderly population.

In addition to suboptimal DXA availability, there is **no reference database for Saudi population for DXA measurements.** Different hospitals use different databases (NHANES or Lebanese databases). A substantial need is to establish a national database via which DXA scans measurements could be standardized across the Kingdom of Saudi Arabia.

Low diagnostic rate of osteoporosis. Over 80% of those treated for a fractured neck of femur are not investigated for low bone density. This is a missed opportunity for clinching the diagnosis as, of those sustaining a fracture and having bone density investigation by DXA, 55% have osteoporosis.

The vast majority of Saudi Arabian patients who are at high risk of fracture remain untreated for osteoporosis, despite effective and safe medications. Currently, more than 90% of patients do not receive pharmacological intervention for secondary prevention.

Poor medication intake and adherence, even after previous fragility fracture. Those who have had one fracture are highly likely to sustain another. A previous study reported that only 4-7% of Saudi Arabian patients with hip fracture are started on anti-resorptive or bone-forming agents. Another recent study suggested that the number of patients with fragility fractures receiving insufficient treatment was lower than in previous reports. Increased efforts to improve treatment initiation are therefore vital to tackle the poor adherence to osteoporosis medications that limits the effect of these medications.

Under-reporting of vertebral fractures. In a 2013 study, vertebral fractures were identified in 20% of Emergency Department chest radiographs in elderly patients. Of those identified retrospectively by Amin and colleagues, only 38% were reported as a fracture in the radiological report. This emphasizes the need for clinician education.

Lack of data. Recent epidemiologic and costing information on osteoporosis in the Kingdom of Saudi Arabia is scarce. As a result, it is difficult to navigate the fracture landscape. Furthermore, treatment monitoring is in its infancy and there is no national system for collecting and monitoring data.

Lack of osteoporosis knowledge in society. Despite the significant role played by several societies in disseminating information regarding osteoporosis, the Saudi public are largely unaware of bone health, fragility fractures and osteoporosis. There are **no local or national patient / professional societies sponsoring FLS education** in existence.

SOLUTIONS EXIST: POLICY RECOMMENDATIONS

Specific recommendations for policy include:

1 Develop a common voice for osteoporosis, raise the importance of fragility fracture prevention and therapy, and increase awareness for osteoporosis

- Osteoporosis must become a public health priority. Develop a common voice for osteoporosis stakeholders and integrate bone fragility in national policies.
- Collaboration, support and mentorship opportunities with other organizations are crucial to developing a nationwide plan for FLS. This can be achieved by identifying key local FLS leaders and establishing an accredited standard through Capture the Fracture® - 'Getting To Gold 'programme.
- Improve public awareness of osteoporosis. Patient associations need to be developed and extended to raise awareness in both lay public and healthcare spheres. Digital and social media platforms are a potential route to reach the general population, especially as more than 80% use these platforms.
- Measures such as educational activities should be taken to improve knowledge of the screening and treatment of osteoporosis in healthcare workers. Scientific and academic groups are important to design and develop continuous medical education programmes, particularly aimed at primary care practitioners.
- Funding at the clinical level is important as this has been shown to be an obstacle in education and implementation of care pathways.

2 Establish more FLS to increase post-fracture screening, diagnosis and treatment rates

- Look to the success stories of efficient FLS inthe Kingdom of Saudi Arabia (such as Al-Noor Specialized Hospital Mecca, King Fahd Hospital, King Khalid University Hospital Riyadh and Almouwasat Hospital in Dammam) and compare current practices with other countries taking part in CTF.
- More data on the efficiency of FLS within Saudi Arabian policy can inform and optimize future practice.
- Emphasizing the need to expand FLS and changing organizational incentives to make it possible.

- Emphasizing the key roles of nurses, nurse practitioners and FLS coordinators.
- Protocols should be set in place to improve diagnosis and treatment rates and bench-mark these changes.
- Promote better coordination and establish clinical pathways between primary care physicians, and secondary care health professionals

3 Audit fractures, gather evidence and set-up national plan

- More studies and audits are needed to expose the numbers and financial implications of detection and treatment of fragility fractures. The set-up of national databases to collate these statistics is imperative to achieve this aim.
- Gather evidence demonstrating improvement and gains from existing osteoporosis service-providers in the country and perform pilot studies to emphasize the benefits of providing good, consistent FLS countrywide.
- Establish a reference database for Saudi population for DXA measurements to allow consistent, homogenous practice.
- Further workshops should be set up to foster sharing of knowledge, developing strategies for the implementation of nationwide FLS and standardizing treatment and care pathways for patients.

BUILD YOUR RESPONSE

Find and treat your fractures by developing FLS

- **Set-up hip and/or PFC registries in the Kingdom of Saudi Arabia.** This could be set up with the aid of Emergency Rooms, in-patient and out-patient administration, as well as in private clinic and general practitioner settings. All disciplines within healthcare should be encouraged to identify fragility fractures, record in a registry and use a clear pathway for consistent treatment.

- **Recognize the unmet need for bone density screening,** treating osteoporosis as a treatable disease and encouraging fragility fracture prevention. Once post-fracture care is recognized as a priority (and osteoporosis as a disease) which can be effectively managed, policies should be devised to seek out those who would benefit from a Post-Fracture Care programme**.**

- **Improve the infrastructure already in place.** The Kingdom of Saudi Arabia has a very small number of FLS on the CTF map. Coalition of these facilities would strengthen the CTF message and improve patient outcomes**.**

- **Shift national and medical opinion of fragility fractures and osteoporosis among patients, clinicians and hospital managers** and enforce the concept that it is a disease for which there is robust treatment.

- **Facilitate and improve the development of FLS and additional network structures to improve diagnosis and treatment rates.** Draw on the resources and guidance from the IOF/CTF to develop Saudi Arabian policies, foster coalition, improve mentorship, and utilize FLS databases (as described below).

Make use of available resources

The International Osteoporosis Foundation has developed several tools to facilitate and improve the development of Post Fracture Care/FLS including:

1. **The Policy Toolkit** which is a CTF-P Guidance for Policy Shaping generic narrative and associated resources (slide kit in several languages, Executive Summary, Infographic, webinar, outline video

and policy toolkit.) https://www.capturethefracture.org/resource-center/advocating-for-pfc/policy-toolkits

2. **The Capture the Fracture® Resource Centre** (https://www.capturethefracture.org/resource-center) which provides tools and resources to achieve the following:

   - Implementing an FLS
   - Improving an FLS
   - Advocating for the development of FLS

The Capture the Fracture® programme provides tools and resources to optimise post-fracture care:

1. **The Best Practice Framework**

   - Provides guidance for institutions that are implementing FLS
   - Sets benchmarking criteria to stimulate quality improvement of post-fracture care services at the organizational level

2. **The Mentorship Programme** which partners experienced FLS leaders with newly formed services or existing services

3. **The Benefit Calculator:** a microsimulation tool to estimate the financial consequences of improving post-fracture care.

Form a policy team

- **Use renowned international and national mentors/collaborators** to educate and monitor the implementation of fragility fracture care pathways and FLS development. Inviting all the relevant key players in the field of FLS to participate in events which would consolidate collaboration over the longer term.

Reinforce your evidence base

- Build a **national osteoporosis patient and fracture registry.**
- **Utilize the benefit calculator** to assess the expected financial impact of interventions to ensure you stay on track and utilize the extensive resources available.
- Academic institutions should encourage **researchers to pursue further investigations** on country-based clinical and epidemiological data to facilitate the prevention and treatment of subsequent fractures in particular.

Educate the staff

- **Medical education needs.** Further training for clinicians and healthcare professional in the detection of low bone density and its subsequent treatment are imperative in order to rationalize the detection and treatment plan of fragility fractures, leading to improved outcomes.

Engage the public

- **Patient associations** need to be developed and extended to raise awareness in both lay public and professional healthcare spheres.
- **Engage the public at large** and with educational resources and high-quality literature. Policy recommendations for patient and public involvement and engagement leveraging collaboration with local societies are needed. There must be an interconnection between policy changes and patient groups.
- **National campaigns for the awareness of osteoporosis and fragility fractures** should be trialed to raise awareness in Saudi society.

Foster healthy ageing

- **Empower clinicians and educate health care managers and professionals that healthy bone ageing is possible,** and that chronic bone conditions can be managed, to prevent future fracture.
- **The vital importance of adherence to prolonged drug therapy should be highlighted** and the positive outcomes resulting from good therapeutic adherence should be emphasized.

- **Promote falls prevention services and improve the physical capacity of older individuals,** in order to support physical activity and autonomy.
- **Focus on fractures rather than 'osteoporosis'.** There are common misconceptions regarding osteoporosis including "osteoporosis treatments are not effective" or "losing height is normal". Targeting public health awareness campaigns at fractures will be more successful, for example "the first fracture must be the last!".
- **Consider the following systematic interventions:**

b. Screen height loss once a year

c. Screen falls risk

d. Perform osteoporosis screening for patients suffering from chronic disease

ANNUAL HEIGHT MEASUREMENTS

EARLY IDENTIFICATION OF CHRONIC DISEASES

FALLS RISK SCREENING

Increase awareness of osteoporosis throughout the lifecourse

- Leverage **World Osteoporosis Day** (on October 20 of each year) as a substantial opportunity to educate consumers and health professionals about osteoporosis and fracture prevention, and promote case-finding during this period.
- **Extend DXA prescription** in line with the Saudi Arabian guidelines.
- Start early with **prevention campaigns in schools:** how to build strong bones, encouraging physical activity, to get sufficient levels of protein.
- Focus on **general health in the population:** make sports fun, accessible and affordable by making it a priority in the policy of local councils.
- Incorporate **osteoporosis screening** into established annual elderly health checks.
- Scientific societies should encourage health care professionals to utilize the **FRAX®** country-adjusted risk calculation algorithms.

Glossary

FRACTURE – a broken bone

FRAGILITY FRACTURE - A broken bone which occurs due to minor force, such as a fall from standing height. The risk of fragility fractures can be reduced by lifestyle modifications, supplementation of calcium and vitamin D, falls prevention programmes and anti-osteoporosis medication.

FRACTURE LIAISON SERVICE (FLS) - See Post-Fracture Care Coordination Programme. A model of care which seeks to rehabilitate individuals after they have had a fracture and reduce the risk of them fracturing again in the future. The term is interchangeable with *POST-FRACTURE CARE (PFC) COORDINATION PROGRAMME.*

OSTEOPOROSIS - Osteoporosis is a disease in which the mass, density and strength of bone are reduced. As bones become more porous and fragile, the risk of fracture is greatly increased. The loss of bone occurs silently and progressively. It primarily affects the elderly and is more common in women than in men.

PRIMARY PREVENTION OF FRACTURES - Initiatives to prevent a first/sentinel/initial fracture occurring.

SECONDARY PREVENTION OF FRACTURES - Initiatives to prevent second/subsequent/further fractures occurring after the first fracture has occurred.

QALY (QUALITY ADJUSTED LIFE YEARS) - a generic outcome measure commonly used in economic evaluations that account both quantity and the quality of life. One QALY corresponds to one year of perfect health.

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Our vision is a world without fragility fractures, in which healthy mobility is a reality for all

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