

Osteoporosis and fragility fractures

A policy toolkit

The
**Health Policy
Partnership**

AMGEN[®]

About this toolkit

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What is this toolkit and who is it for?

We have developed this toolkit to drive the policy changes needed to ensure that best-practice care is available to the millions of osteoporosis patients in Europe, so they can avoid fractures and maintain their quality of life, mobility and independence.

This toolkit is for policymakers working at all levels, with three key aims:

- Raising awareness of the challenges associated with osteoporosis and fragility fractures for people in Europe, and their impact on health systems and societies
- Analysing and presenting the critical health system barriers and gaps which are hindering access to clinical best practice in Europe
- Supporting policymakers to implement key policy actions required to ensure people have access to the care and support they need to maintain their independence and quality of life.

This toolkit recognises, pays respect to and builds on existing landmark research, projects and reports, such as the International Osteoporosis Foundation's report *Broken bones, broken lives: A roadmap to solve the fragility fracture crisis in Europe*,¹ the Fragility Fracture Network's 2018 *A global call to action to improve the care of people with fragility fractures*² and many more, which are noted in the **Supporting resources section (page 58)**. This policy toolkit aims to be a natural extension of this earlier work but is also distinct in representing a wide multidisciplinary consensus based on the perspectives of policymakers, patients, carers, clinicians and non-profit organisations, while maintaining a policy focus specifically for a parliamentary audience.

Dedication

This toolkit is dedicated to the millions of people in Europe living with osteoporosis and fragility fractures, both today and in the future, and to the policymakers, patient and carer associations, clinicians and non-governmental organisations that have demanded and achieved powerful changes in the lives of people with osteoporosis and fragility fractures. It is our hope that this toolkit can take its place alongside these tireless endeavours and that, together, we can demand the change that is needed at the highest levels to ensure that no one is left behind.

On behalf of the Working Group and Parliamentary Forum
and The Health Policy Partnership

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Call to action

By 2025, it is estimated that 4.5 million fragility fractures will occur in the European Union (EU) each year, and that 34 million people will be living with osteoporosis, a chronic disease which weakens bones and leaves people at risk of a fragility fracture.³

Few diseases affect so many of us as we grow older: 1 in 2 women and 1 in 5 men over 50 will experience a fragility fracture in their lifetime³ – often leading to a loss of mobility and independence.⁴

This represents a huge economic burden. Fragility fractures cost EU healthcare systems €37.4 billion³ and account for around 3% of healthcare costs, significantly higher than for many other leading chronic diseases.^{3,5}

Yet osteoporosis and fragility fractures have for too long been ignored in health policy and European research agendas.^{6,7} Even policies, strategies and programmes that focus on healthy ageing and women's health may ignore the impact of osteoporosis and fragility. This has left millions of people – mostly women – without access to the care and support they need to live full, independent lives.

By prioritising osteoporosis and fragility fractures, gender differences in health and wellbeing can be reduced.⁸ In addition, the quality of life of older people can be enhanced and the financial sustainability of our already stretched healthcare systems can be strengthened.

As the authors, contributors and supporters of this policy toolkit, we cannot accept a future where preventable fragility fractures are allowed to cause such needless suffering and cost. The time has come for urgent action on osteoporosis and fragility fractures, uniting patient, carer and clinical leadership with wider societal and political advocacy actors in order to strengthen the call for change.

We endorse the policy aspirations of the International Osteoporosis Foundation and the Fragility Fracture Network's call to action² and seek to play our part in building wider societal and political awareness for progress and change.

The following organisations support and endorse this toolkit:



Call to action on European institutions

The European Union should recognise the scale of societal and structural interests at stake, and foster strategic cooperation between countries.

European institutions, including the European Commission (EC) in cooperation with Member States and the European Parliament, should:

- **Continue to support the European Innovation Partnership on Active and Healthy Ageing (EIP on AHA)** as a coordination platform which allows partners to pool resources and share experiences in pursuit of innovative solutions to healthy and active ageing. Support for the partnership should continue beyond 2020 and consider widening its scope to include fragility fracture prevention.
- **Continue to invest in Joint Actions which support the prevention of fragility fractures and falls.** The CHRODIS+ Joint Action on chronic disease and the ADVANTAGE Joint Action on frailty end in 2020. Future initiatives should include a focus on osteoporosis and the prevention and management of fragility fractures.
- **Ensure osteoporosis and fragility fractures are included in eligible activities funded under the European Social Fund Plus (ESF+).** ESF+ activities in health must support Member States to recognise the central role of improving prevention and care for osteoporosis, fragility fractures and falls.
- **Include prevention of fragility fractures in the joint Organisation for Economic Co-operation and Development (OECD)/EC publication *Health at a Glance: Europe* as well as the 'State of Health in the EU' cycle.** Although time to surgery following hip fractures is included, prevention of fractures must be prioritised.
- **Ensure specific attention for osteoporosis and fragility fractures by the Steering Group on Health Promotion and Prevention and by the Expert Panel on Effective Ways of Investing in Health.** Statements and recommendations could be prepared to specifically support improved identification and management of osteoporosis through screening and effective fragility fracture prevention.
- **Prioritise fragility fracture and falls prevention in European-level occupational health and safety initiatives.** The EU's Occupational Safety and Health Strategic Framework, as well as future initiatives in this domain, must recognise the importance of reducing falls at work and propose concrete measures to minimise fragility fractures among older workers.
- **Support and coordinate pan-European research on osteoporosis and fragility fractures, via Horizon-Europe's health cluster.** Research could be devoted to better understanding methods for identifying people at risk of fragility fractures and to test innovative prevention and care models.
- **Support activities in the European Parliament which seek to address osteoporosis and fragility fractures.** Concerned stakeholders could, for example, seek interest from MEPs in the formation of an interest group on osteoporosis and fragility fractures.

Non-EU countries may take inspiration from these recommendations, in addition to the call to action to national leadership on page 10.

Call to action on national leadership

Historical failures in the care of osteoporosis and the prevention of fragility fractures are profound and will not be resolved without political, whole-system leadership.

We call on policymakers to ensure public policy is fit-for-purpose in light of future demands. Specifically, we call on governments, parliaments, payers and national public health institutes to, at a minimum:

- **Integrate osteoporosis, fragility fractures and falls prevention into high-level national strategies and plans for health and healthcare,** including those which aim to address chronic diseases and women's health.
- **Acknowledge the huge significance of fragility fractures by ensuring they are integrated into wider societal plans,** including those for population health, healthy ageing, long-term care including informal care, and workforce productivity.
- **Develop a national consensus on preventing fragility fractures through more systematic identification of people with osteoporosis.** This should include consideration of screening specific groups. Any national decision on screening must be based on national epidemiological and economic data, including the feasibility and cost-effectiveness of integrating osteoporosis screening alongside other screening programmes such as those for breast cancer.
- **Adopt and encourage the implementation of clinical guidelines** for osteoporosis and fragility fracture prevention and care. These guidelines should be available in the national language and, at a minimum, include nationally approved risk assessment tools, as well as timely referral and access to osteoporosis diagnosis.
- **Ensure reimbursement structures reflect national scientific consensus on detection, care and prevention for osteoporosis and fragility fractures.** Reimbursement decisions should reflect the true costs of fragility fractures to the wider healthcare system and society. At a minimum, there should be reimbursement for nationally recommended diagnostic tools (such as dual-energy X-ray absorptiometry (DXA) scanning and the Fracture Risk Assessment Tool (FRAX®)) and treatments.
- **Develop nationwide registries and audits to enable local-level monitoring and surveillance of patient health outcomes.** This should include collecting and monitoring data on the diagnosis of osteoporosis and for the prevention and care of fragility fractures, spanning hip and vertebral fractures at a minimum. Policymakers should also consider how these data could be used to incentivise improvements in the quality of care.
- **Actively support efforts to improve public awareness of osteoporosis, fragility fractures and falls prevention.** This includes ensuring people have a clear understanding of their personal risk factors and the preventive options available to them.

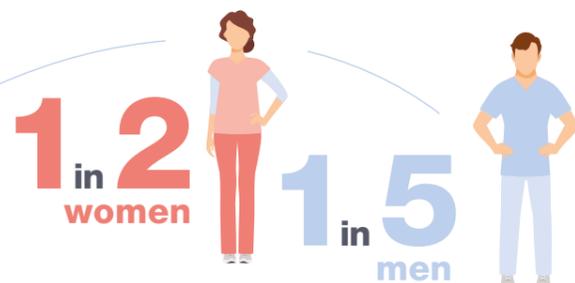
Call to action on regional and local systems

Improvements to people's lives will ultimately be driven by improved access to appropriate prevention and care at a local level.

We call on health system leaders, including payers and the medical community, to invest in sustainable, multidisciplinary care models for osteoporosis, fragility fracture and falls prevention, which span hospital, primary and community care settings. This will require:

- **Primary care professionals to take a leadership role in the detection, management and care of osteoporosis and fragility fractures.** Specific roles and responsibilities in primary care should be developed with professional bodies and payers. Delegation to other roles (e.g. pharmacists, specialist nurses and physiotherapists) should be considered alongside requirements for professional education and training for all involved.
- **Every country to adopt and implement approved clinical guidelines** for osteoporosis and fragility fracture prevention and care. These guidelines should be available in the national language and, at a minimum, should include nationally approved risk assessment tools, as well as timely referral and access to DXA for adequate diagnosis of osteoporosis.
- **Every locality to develop and adopt an osteoporosis and fragility fracture care pathway.** This should include the development of local criteria to establish whom the pathway should be applied to.
- **Ensuring the availability of person-centred multidisciplinary models of care with demonstrated impact on reducing the risk of repeat fractures and death.** At the very least, every general hospital should offer orthogeriatric services and a coordinated follow-up service (e.g. fracture liaison service) so that every fracture patient has the option to be treated or referred there for care and immediate follow-up post-fracture. This care should be delivered in a way that addresses people's needs and preferences.
- **Ensuring a comprehensive falls assessment is available for every geriatric patient.** This should be available in clinical settings as well as community settings (such as specialist housing and people's own homes) and offer the opportunity for self-assessment. It should bring together multidisciplinary input and risk factor management for falls alongside detection and treatment of osteoporosis.

Executive summary



over 50 will experience a fragility fracture in their lifetime³



3.5m fragility fractures occur every year in the EU³

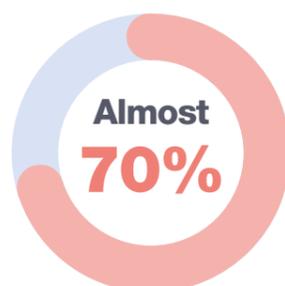
Osteoporosis is a chronic disease which weakens bones and leaves people at risk of a fragility fracture.³ Bones weaken naturally as people age, but factors such as menopause, taking certain medications and poor nutrition can hasten this process and lead to osteoporosis.⁹⁻¹¹

Fragility fractures are often life-changing events, bringing pain, isolation and dependency.¹² What were once simple, everyday tasks can become difficult or even impossible. The reduction in quality of life and fear of falling can also place a significant toll on the mental health of patients and their informal carers.¹²

The number of people who have osteoporosis and experience a fragility fracture is alarmingly high. Osteoporosis affects 21% of women and 6% of men aged 50–84 in the EU.³ This contributes to a situation whereby every day, nearly 10,000 fragility fractures occur,³ most of which are among women over the age of 50.

Yet most patients are still being failed by healthcare systems, and too many fractures occur that could be prevented. Even after a fracture, 60–85% of women in Europe do not receive treatment.¹ Rates of medication use are actually decreasing,¹⁴ and access to the most effective models of fragility fracture care in hospital and following discharge is the exception, not the rule.¹

Fragility fractures represent a significant economic burden on healthcare systems and societies in Europe. They account for around 3% of EU countries' healthcare costs, which is significantly higher than for many other leading chronic diseases, such as stroke and coronary heart disease.^{3,5}



of women over 70 who have osteoporosis have not been diagnosed¹³

As populations across Europe age, the scale of this burden is set to grow,¹ representing a significant challenge to healthcare sustainability. The number of fragility fractures is expected to rise by almost a quarter by 2025, leading to a 22% increase in fracture-related healthcare costs.³

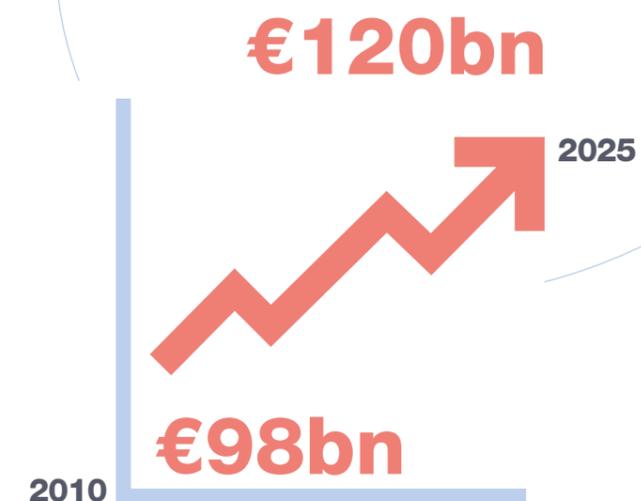
Yet effective clinical and service models exist to prevent fragility fractures and maintain independence – the challenge is implementing them at scale. We can:

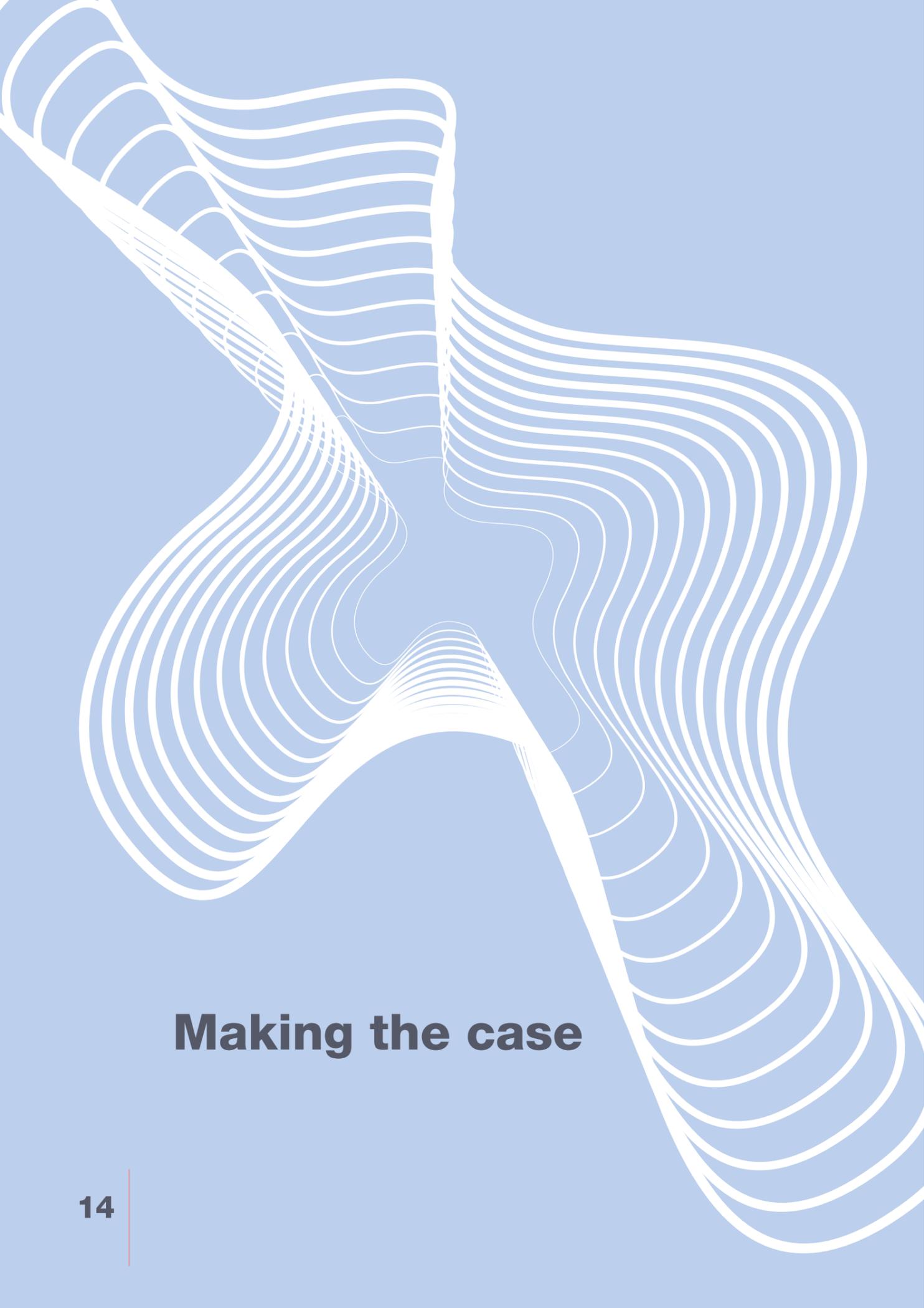
- **Identify people early.** Early identification and initiation of treatment can reduce the risk of hip fracture by around 30%.¹⁵
- **Provide best-practice hospital care for fracture patients to ensure the best chance of recovery.** International guidelines exist for fragility fracture care and are most effectively delivered when implemented by a multidisciplinary team.¹⁶⁻¹⁸
- **Reduce the risk of subsequent – and often more serious – fractures after discharge.** Proven models of integrated care, such as fracture liaison services, can be used to identify fracture patients and signpost them to preventive follow-up care services.¹⁹
- **Assess a person's risk of falls and take appropriate preventive actions.** Comprehensive rehabilitation, assessing and adapting living environments, improving balance through exercise and medication reviews can all reduce the risk of falls.²⁰⁻²²
- **Empower people by raising awareness and understanding of their risk of fragility fractures and help them to make the changes needed to reduce it.** People who understand their fracture risk may seek health professional advice and recognise the importance of consistently implementing preventive strategies such as lifestyle modifications and treatment.²³



Fragility fractures cost EU healthcare systems **€37.4bn** per year³

Societal costs per year in the EU³





Making the case

What are osteoporosis and fragility fractures and what impact do they have on people's lives?

Osteoporosis is a chronic disease that weakens bones, leaving them prone to fractures

Osteoporosis is characterised by low bone mass, which depends on bone development during childhood and adolescence and how quickly bone mass is lost through adulthood.^{24 25} While bone development is influenced by genetic and biological factors, such as sex and age (see below), a number of lifestyle factors also play a role including nutrition and physical activity.²⁶ Bone mass naturally decreases in older age, but low body weight, inadequate physical activity, smoking, alcohol consumption and certain medications contribute to more rapid bone loss.⁹

Osteoporosis is typically a 'silent' disease which can often progress without symptoms until its most severe consequence, a fragility fracture, is experienced. Fragility fractures are fractures which occur with often surprisingly modest stresses and impacts that would not be expected to cause breakages in healthy bones. The most common fragility fractures are hip, spine (vertebral), forearm and upper arm (humeral).³

Fragility fractures can be life-changing events, with severe physical and psychological consequences

Pain and limited mobility following a fragility fracture mean people are often at risk of losing their independence, a widely feared consequence. In a study among women at high risk of a hip fracture, 80% said they would rather die than experience the loss of independence attributed to a hip fracture.¹² The experience of a fracture can further cause anxiety due to a fear of falling, self-image issues and the limitations associated with carrying out day-to-day activities.^{4 27}

Family and friends can suddenly find themselves becoming carers with often limited support. National programmes are often insufficient or difficult to access, leaving people to manage the emotional and financial burden of becoming an informal carer without the support or guidance they need.^{28 29}



Having a fracture can change your life completely. People often feel they are no longer the masters of their lives and can't look after themselves independently. Normal, everyday activities can become very difficult and painful. In addition, you may suddenly face high costs and you cannot go to work.



**ANSA HOLM, FINNISH
OSTEOPOROSIS ASSOCIATION**

“ **Osteoporosis mostly affects older women. It is an invisible disease among an invisible group. We must give it a face and demand that policymakers stop ignoring it.** ”

PENILLA GUNTHER, FORMER MP, SWEDEN

Older women are most at risk of osteoporosis and associated fractures, but men are also at risk

While lifestyle factors can influence the development of osteoporosis, the most common risk factors are being female and older age.³⁰⁻³¹ With advancing age, bone structures become weaker and bone mass decreases progressively; as a result, the proportion of people with osteoporosis increases. In addition to lower bone mass, older people are also at greater risk of falls, making them particularly prone to fragility fractures.³²⁻³⁴

Being female is a major risk factor due to differences in bone structure and metabolism, particularly the loss of oestrogen following menopause.¹¹ While women make up the large majority of people who experience fragility fractures, men are also at risk. Although men initially experience a slower decline in bone mass than women, by the age of 65, the rate of loss of bone mass is the same for both sexes. As men are often older when they experience a fragility fracture, the consequences can be more severe, including a higher risk of death.³⁵⁻³⁶

Gender bias in healthcare can impede diagnosis and effective treatment of people with osteoporosis or at risk of a fragility fracture

Women are often disadvantaged due to disparities in provision of care. For example, men are more likely than women to be referred to certain specialists³⁷ and women are more often diagnosed with medically unexplained pain than men, potentially preventing appropriate diagnoses and leading to poor perceptions of healthcare.³⁸ As a disease that largely affects women, osteoporosis is too often ignored in healthcare.³⁹⁻⁴⁰

The perception that osteoporosis affects *only* women, however, means men are less often screened and treated for osteoporosis following a fracture, and less evidence exists for their diagnosis and therapy.¹¹ Ultimately, if healthcare professionals and the public keep underestimating the risk of osteoporosis in women, it is likely to be even less recognised among men.

The burden of osteoporosis and fragility fractures in Europe is significant and growing

In the EU, osteoporosis affects around 21% of women and 6% of men between the ages of 50 and 84.³ Globally, as many as one in two women and one in five men over 50 will experience a fragility fracture in their lifetime.³ The burden of fragility fractures varies across Europe, with much higher rates in northern European countries compared to countries in the south such as Spain and Portugal.³

Fragility fractures are a major driver of preventable deaths and disability

Fragility fractures are associated with increased risk of death and disability, and more frequent hospital admission.⁴¹ Globally, the burden of years lived in poor health due to osteoporosis is greater than that caused by cancers (except for lung cancer) and is comparable to or greater than that of many other non-communicable diseases, such as asthma and hypertension-related heart disease.⁴² Hip fractures have been found to at least double the risk of death for both men and women.³⁶⁻⁴³ In 2010, 43,000 deaths in the EU were causally related to fractures.⁴⁴

“ **It’s been called an invisible disease... number one, you don’t have symptoms beforehand, and number two, it affects older women much more so than any other group – and older women tend to be invisible.** ”

MARIAN HARKIN, FORMER MEP, IRELAND

The cost of inaction: the economic case for change

The economic impact of fragility fractures is significant and is set to rise quickly if no action is taken. By supporting the implementation of available cost-effective prevention strategies, policymakers can help reduce the burden of fractures on health systems and the wider economy.

Fragility fractures represent a significant cost to EU health systems

Fragility fractures incur billions of euros of medical costs each year, putting significant pressure on health systems.⁴⁵ On average, fragility fractures represent 3% of countries' healthcare spending, estimated at €37.4 billion across the EU in 2010 – rising to €98 billion when taking into account the impact on health-related quality of life.³ This financial burden is higher than for many other major non-communicable diseases. For example, the EU's direct healthcare costs in 2015 were estimated at €20 billion for stroke and €19 billion for coronary heart disease.⁵

Europe's population is ageing and will increasingly be affected by fragility fractures

The EU has one of the most rapidly ageing populations in the world.⁴⁶ As a result, health expenditure will continue to increase.^{47 48} In this context, the number of people living with osteoporosis in the EU is expected to increase by almost a quarter, from 27.5 million in 2010 to 33.9 million in 2025.³ Similarly, the number of fragility fractures in the EU per year is also expected to rise from around 3.5 million in 2010 to nearly 4.5 million by 2025.³

These changes will have a significant impact on fragility-fracture-related healthcare costs. Healthcare costs associated with fragility fractures are expected to rise by 22% between 2010 and 2025. This will vary by country, ranging from an increase in healthcare costs due to fragility fractures of between 5% in Bulgaria and 44% in Ireland.³

In an ageing population with an ageing workforce, fragility fractures have a significant and growing impact on workforce productivity

As Europe's population ages, the proportion who are of working age and paying taxes is shrinking, increasing financial pressure on health and social care services to cover the increasing costs of osteoporosis and fragility fractures. In 2016, there were 3.4 people of working age for every person aged 65 or over in the EU⁴⁶ – by 2050, it is estimated that there will be fewer than two people of working age for every person aged 65 or over in the EU.⁴⁹

At the same time, the workforce in the EU is ageing, as a growing number of older people remain in work beyond the age of 65.^{47 50} While this will, to some extent, mitigate the financial pressure on health services noted above, it will also increase the prevalence of chronic conditions – including osteoporosis and fragility fractures – among the working population. Unless action is taken to prevent fragility fractures, this is likely to have a significant impact on workforce productivity as sickness absence rates are often highest among workers aged 65 and over.⁵¹

In addition, individuals who have experienced a fracture may rely on informal care from friends and family,^{1 52} many of whom may need to cut down their working hours or leave paid employment due to difficulties in balancing paid work with care responsibilities.^{1 52 53}

Cost-effective ways to prevent fragility fractures and improve patient outcomes include osteoporosis medication and integrated post-fracture care

Responding to the fragility fracture crisis requires more consistent implementation of cost-effective and cost-saving screening, treatments and services.^{10 19} In general, osteoporosis medication is cost-effective and even cost-saving when given to individuals at high risk of fracture and taken consistently.^{10 54 55} However, cost-effectiveness relies on treatment being continued,⁵⁵⁻⁵⁷ so implementing services that support people to take their medication regularly is essential.⁵⁸ A simulation model in Sweden, for example, showed that if people who were prescribed osteoporosis medication stayed on treatment for 50% longer, a total of €3.3 million would be saved over 10 years.⁵⁹

Implementing models of integrated post-fracture care is vital to improving treatment outcomes in a cost-effective way.¹⁰ A number of proven programmes^{60 61} and orthogeriatric services¹⁰ have been shown to increase the likelihood that people will continue to take their medication and prevent fractures while also being cost-effective.⁵⁸ Fracture liaison services (FLS), the most widely evaluated model, are consistently shown to be cost-effective or cost-saving.^{19 62 63} In the UK, for example, nationwide implementation of FLS could significantly improve the quality of care and help to reduce fractures with no additional cost to the health system; in fact, cost savings would be highly likely.⁶⁴

More than
7.6m sick days
were taken due to fragility fractures in France, Germany, Italy, Spain, Sweden and the UK in 2017¹

“Over the coming years, the proportion of the retired population will dramatically increase in the whole of Europe. It is imperative that we maintain the mobility and independence of older people.”

PAUL MITCHELL, FRAGILITY FRACTURE NETWORK

Delaying the decline in bone health

Preventing fragility fractures through effective multidisciplinary and integrated care

Without lifelong prevention and timely intervention, age and other key risk factors can lead to a gradual decline in bone mass and an increased risk of fragility fracture. This can have a serious, often irreversible impact on overall health and physical functioning, even with high-quality care and rehabilitation.

This figure outlines the changing needs of people with osteoporosis as their condition develops and their risk of a fragility fracture changes. It also points to key opportunities which, if harnessed, can delay the decline of bone health and prevent fractures.

Changing fracture risk and impact on health and quality of life

Whole population

Population: All ages and both sexes.
Impact: If risk factors are not managed, bone health declines.
Key goal: Maintain bone health and delay onset of osteoporosis and fragility fracture risk.

People with an increased risk of fracture

Population: People for whom a combination of decrease in bone mass and other factors (lifestyle, health status) warrants medical intervention to better manage risk. Mostly includes post-menopausal women; however, other groups can also be affected.
Impact: First fragility fractures can be distressing and often indicate the progression of bone fragility and growing risk of fractures.
Key goal: Preserve physical function and avoid fractures and falls.

People with severe risk of fracture

Population: People with well-established osteoporosis, frailty and/or other risk factors. This includes people who have already experienced serious fractures. Many are older and are also living with other chronic diseases.
Impact: Fragility fractures can cause deteriorating overall health and physical function and can even lead to death. Many people struggle to regain independence, instead experiencing high care and support needs.
Key goal: Avoid debilitating fractures and maximise quality of life.

Building blocks of an effective policy response

Good bone health across the life course

- Promote healthy lifestyles and behaviours to maintain good bone health.



Catching it early

- Develop and implement national guidance on early identification.
- Provide training and support for primary care professionals.
- Integrate osteoporosis and fracture risk identification into person-centred care models.



Getting people back on track

- Ensure access to multidisciplinary acute (in hospital) care and rehabilitation.
- Ensure access to coordinated post-discharge care through models such as fracture liaison services.



Supporting quality of life as part of healthy and active ageing

- Ensure comprehensive falls risk assessments are routinely undertaken in older and frail populations.
- Incentivise collaboration between health and social care services.



Building a system that works

- Integrate fragility fracture prevention into European and national policies and strategies.
- Establish comprehensive fracture registries and audits.
- Ensure reimbursement structures support access to best-practice care.



Engaging patients and public

- Build patient and public awareness of osteoporosis and fragility fractures as a serious health concern.
- Prioritise person-centred care, including empowering people to understand their risk of fragility fractures, contribute to decisions about their care and management, and optimise their role in preventive behaviours.



Prevention of osteoporosis across the life course

Promoting a healthy lifestyle at all ages will be important in reducing the burden of osteoporosis for future generations in Europe. Smoking, alcohol consumption, unhealthy diets and lack of exercise cause a range of chronic diseases and contribute to approximately 790,000 deaths every year in the EU.⁶⁵ Given that these lifestyle factors from conception through to old age can also affect the risk of osteoporosis and related fractures, there is a need for governments to continue to support health and wellbeing across the whole life course.²⁵

Encouragingly, many countries have published national prevention strategies which aim to improve population health and prevent disease.⁶⁶⁻⁶⁸ The need to address these risk factors and improve prevention strategies has also been recognised by policymakers at the European level.⁶⁹

Such strategies could also impact osteoporosis and fragility fracture prevention in the long term by including bone health as a specific target. For example, healthy bone development may be improved by promoting adequate vitamin D intake during pregnancy and throughout childhood, and by supporting good nutrition and sufficient exercise in the whole population.²⁴ Policies to prevent smoking and limit alcohol consumption may also help to reduce the number of people who develop osteoporosis, further justifying preventive measures and investment to achieve these wider goals.

However, as with many chronic conditions, disease-specific and healthcare focused efforts are needed to deliver outcomes for those populations at the greatest risk in the short to medium term. We do not have the luxury of focusing solely on population-wide health; chronic conditions such as osteoporosis are becoming more common and the number of fragility fractures is rising.¹ This points to the critical need for investment in more effective prevention policies and programmes.⁶⁹

While this policy toolkit recognises the essential role of improving population health for the prevention of osteoporosis and fragility fractures, it prioritises improving care for those people who are already at risk.



Building blocks of an effective policy response

1. Building a system that works: policies for scrutiny, accountability and investment



To ensure health systems in Europe are prepared to respond to the growing burden of fragility fractures, health and social services must be improved for people before and after they have had a fracture. This will require buy-in from stakeholders at all levels and a supportive policy environment in which osteoporosis is recognised as a priority.⁴⁴ Three cross-cutting elements are required to ensure clinical care is optimised across the whole patient journey:

- A. Integrating osteoporosis and fragility fracture prevention into European and national policies and strategies:** strategic leadership in policy development is key to ensuring longer-term investment and accountability, as is a clear vision of current and future demand on the healthcare system, and the setting of achievable and measurable targets in pursuit of justified long-term goals.
- B. Establishing comprehensive registries and audits:** the availability of high-quality data on osteoporosis and fragility fractures is essential for effective scrutiny, performance management and planning, and can create vital feedback at the national and local level.
- C. Setting up reimbursement structures:** adequate reimbursement needs to be in place to ensure access to best-practice care at all levels of service delivery. Where helpful, this should consider the wider costs of failing to prevent fractures across the whole pathway.

A. Integrating fragility fracture prevention into European and national policies and strategies

Osteoporosis and fragility fractures are highly relevant for European policy initiatives and strategies concerned with non-communicable diseases, healthy ageing, women's health, health inequalities and social care. Often, however, these initiatives and strategies have not included or prioritised osteoporosis or fragility fractures.⁷

Recognising osteoporosis and fragility fractures as important components in European and national policies would support the development and implementation of vital services. National strategies or action plans often support implementation of population-wide programmes such as education and awareness campaigns.⁴⁴ Recognition at the national policy level would also support greater investment in, for example, registries, diagnostic tools such as dual-energy X-ray absorptiometry (DXA) scanning⁷⁰ and preventive strategies such as medication.⁴⁴

Yet osteoporosis and fragility fractures have received limited attention in European health policy to date and have not been identified as a priority in most European countries.⁴⁴ Despite concerted international efforts to put both on the political agenda,^{1,2} they are not generally viewed with a sense of urgency even though they impose a significant burden.^{44,70,71} As of 2013, most EU Member States (18) had not identified osteoporosis as a policy priority.⁴⁴ France, Italy and the UK are among the few countries included in our analysis that have recognised osteoporosis as a key priority at policy level.⁷²⁻⁷⁵

Osteoporosis and fragility fractures are rarely featured in national policies for chronic disease, healthy ageing and women's health. Health strategies across European countries have recognised the critical role of reducing frailty and maintaining mobility as part of healthy ageing and prevention.⁷⁶ Yet osteoporosis does not usually appear in national prevention strategies.⁶⁷ In policies for chronic disease, other conditions such as diabetes⁷⁷ and heart disease⁷⁸ have received considerably more attention from European policymakers.⁷ A recent analysis showed that musculoskeletal health, which includes osteoporosis and fragility fractures, was only included in half of non-communicable disease strategies for OECD countries.⁷ Few countries specifically address women's needs in national health policy.⁷⁹⁻⁸¹ In those that do, osteoporosis is often absent despite its significant impact on women's health.⁷⁹⁻⁸²

Governments should encourage national consensus on falls and fracture prevention to provide a clear, unified perspective on the policy changes which are needed and how different sectors can work together. The formation of alliances and greater dialogue between different stakeholders including policymakers, health professional societies, the private sector and non-governmental organisations is critical.^{2,83} This alliance building is already underway in some countries in Europe (Greece, Italy, Norway, Spain and the UK),^{84,85} being spearheaded by leading organisations working in osteoporosis and fragility fracture prevention such as the Fragility Fracture Network (FFN) and the International Osteoporosis Foundation (IOF). This focus on national consensus-building is critical in developing and communicating a unified, national call for policy change.



Robust data are critical in driving rapid improvements in hospital services and have a huge impact on patient outcomes.

CONOR HURSON, IRISH HIP FRACTURE DATABASE, IRELAND



B. Establishing comprehensive registries and audits

Policymakers require quality data on osteoporosis diagnosis and treatment, and on fragility fractures, with which they can plan and assess services. These data, however, tend not to be comprehensive, comparable or evenly spread within countries and across Europe. Fracture registries are hugely helpful in this regard, but while they tend to be well established in northern Europe, there are relatively few in southern and eastern parts of the region.⁸⁶ In addition, most European countries do not collect data on the number of all types of fragility fractures. In 2013, comprehensive national fracture registries existed in only 12 countries in the EU.⁴⁴ The majority of existing registries focus on hip fractures, while data on other fragility fractures, such as vertebral and forearm fractures, remain undocumented or under-reported in most EU countries.^{3,87}

Regular clinical audits can act as a driver to rapidly improve clinical practice.⁸⁷ Regular national hip fracture audits, for example, have been shown to improve care standards in several countries such as the UK and Spain.^{86,88-90} Introducing such audits for other types of fractures, such as vertebral fractures, could have a similar effect.

Across Europe, there is great variation in terms of how data on fragility fractures are collected and analysed, limiting policymakers' ability to compare performance between countries. National reports vary in both the quality and amount of data they capture, for example regarding their inclusion criteria or definitions used.^{86,87} To address this, various recent initiatives have developed standard indicators with the intention of establishing common international data sets. These include the FFN Minimum Common Dataset, adopted by several European countries including Spain.⁸⁶

Case study

Fracture Liaison Service Database, UK

C. Setting up reimbursement structures

Availability of adequate funding and reimbursement structures is essential in supporting access to high-quality care. Cost-effective strategies need to be tailored to the national context and adequately resourced to ensure best-practice fragility fracture care is implemented at scale.⁹¹ The paucity of osteoporosis-focused policies, however, has resulted in limited and underfunded fracture prevention services.⁷¹

Reimbursement for diagnosis of osteoporosis is often lacking or restricted.^{10,39,92} Reimbursement for DXA scanning, a key step in the diagnosis of osteoporosis,⁴⁴ is insufficient in many EU countries.³ While 24 Member States provide at least partial reimbursement for DXA scanning, only 10 countries (Denmark, Finland, Greece, Latvia, Luxembourg, the Netherlands, Portugal, Slovenia, Spain and Sweden) are considered to have good access to it.⁴¹ One reason for this is that, in many cases, reimbursement is limited to specific circumstances. For example, reimbursement may be provided only for patients aged over 65 (Austria), only for women (Hungary), or only if the result is positive for osteoporosis (Bulgaria).⁴⁴

Reimbursement for osteoporosis medication is also often restricted, likely contributing to the shockingly low treatment rates for osteoporosis across Europe.^{3,13} The proportion of osteoporosis care costs associated with medication is minimal, amounting to less than 5% in many EU countries.⁴⁵ Despite this, only five Member States (Austria, Italy, Slovenia, Sweden and the UK) provided full, unconditional reimbursement of at least one osteoporosis treatment in 2013.³ In other countries, limited reimbursement can make treatment unaffordable for people or restrict it to specific groups.⁴⁴ For example, Italy and Poland have imposed age restrictions,⁴⁴ and co-payments in Spain and Finland present a barrier to treatment use among disadvantaged groups.^{14,93}



Clinical guidelines are not enough to effect change – only governments can ensure appropriate funding structures and incentives are in place. We must make sure each stage in the patient journey is appropriately resourced and financed.

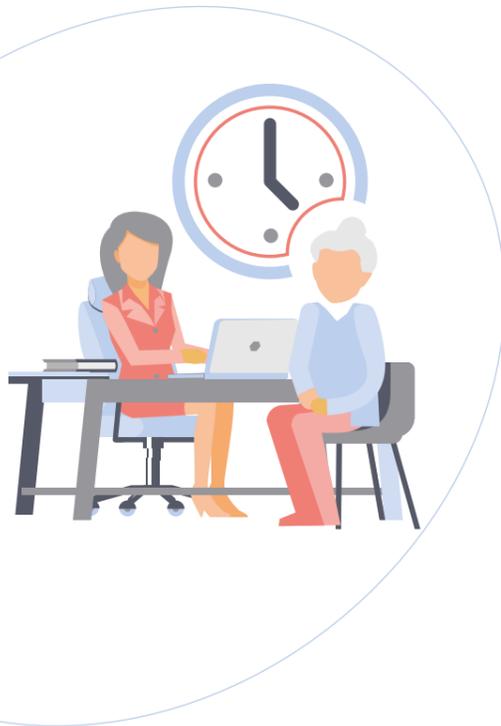


JOHN BOWIS, FORMER MEP, UK

2. Catching it early: detection and management in primary care

Five things you need to know

1. There are proven methods and clear guidance for identifying and treating people at high risk of fragility fractures which, if implemented, can prevent fractures from occurring.⁹⁴
2. Primary care professionals can play a central role in identifying and managing people at high risk.^{1 95}
3. Fragility fractures are commonly overlooked in primary care consultations, however, and people at risk are often identified only after a fracture, or not at all.^{94 96}
4. Gaps in knowledge and a lack of prioritisation among primary care professionals, in addition to a lack of incentives, play a role in hindering the early identification and effective management of people at risk of fragility fractures.^{97 98}
5. Policymakers should foster the use of existing evidence-based and effective strategies for risk identification and management in primary care.



What is it and why is it important?

Identifying people at high risk is vital in preventing fractures and enabling people to maintain independence and quality of life.¹ When a fracture occurs, people often face a significant loss of independence and may not be able to regain their pre-fracture quality of life.⁹⁹ Once people at high risk are identified, a range of often simple, low-cost measures can contribute to improved bone health and lower fracture risk. Osteoporosis medication can reduce the risk of fragility fractures by 30–70% depending on pre-existing risk factors, type of medication and type of fracture.⁹⁴

Primary care professionals can play a crucial role in detecting and managing people at high risk of fragility fractures.⁹⁵ As the first point of contact and provider of routine care, primary care professionals often have the opportunity to detect osteoporosis. In many countries, they can also play a critical role in prescribing and monitoring treatments which reduce the risk of sustaining a fragility fracture.^{44 98}

How do we know it works?

Implementing targeted screening for osteoporosis in primary care among older, postmenopausal women offers the opportunity to effectively prevent fragility fractures from occurring. Recent randomised studies have delivered feasible and cost-effective approaches. A large UK study, for example, showed that community screening among women aged 70–85 years using the Fracture Risk Assessment Tool (FRAX[®]) reduced the number of hip fractures by 28% while also being cost-effective.^{15 54} Furthermore, screening also led to women at high risk of fractures taking their anti-osteoporosis medication for longer.¹⁰⁰ However, it has been noted that more evidence is needed, as, for example, none of the screening approaches piloted in Europe reduced the number of all symptomatic osteoporosis-related fractures.^{54 101 102}

Primary care professionals have a range of evidence-based and effective tools available to implement targeted screening and manage people at risk of a fragility fracture. Risk assessment tools such as FRAX[®], which take into account several risk factors such as age, gender, lifestyle and bone mineral density (BMD), can accurately predict fracture risk and help inform treatment decisions.^{103 104} In addition, the comprehensive geriatric assessment (CGA) provides an opportunity to assess bone health as part of a holistic appraisal of health and wellbeing and to initiate treatment for those found to have a high risk of fragility fracture. It has been shown to be cost-effective and to improve patient outcomes.^{105 106}



Most people – the public and many healthcare professionals – are just not aware of the consequences those with osteoporosis can face. A lot of people don't make the connection between osteoporosis, fragility fractures, loss of independence and – in some cases – even death.

**KARSTEN DREINHÖFER,
GLOBAL ALLIANCE FOR
MUSCULOSKELETAL HEALTH
OF THE BONE AND JOINT
DECADE (G-MUSC)**



What is the current situation?

Across Europe, primary care frequently fails to detect people at high risk of a fragility fracture and initiate appropriate treatment.^{94 96} A recent European study in primary care found that of those women at increased risk of fragility fracture, less than a third were diagnosed with osteoporosis and almost three quarters were untreated.¹³ Similarly, data from the Netherlands found that the proportion of people officially diagnosed with osteoporosis was just 4.3% of women and 0.5% of men aged 50 years and over, representing up to five times less than the proportion of the population estimated to be living with the condition.^{45 107} Alarming, in some cases, rates of diagnosis have been in decline: in France, there has been a decrease in the number of BMD assessments each year by approximately 6% despite good availability of DXA machines to assess BMD.^{44 108}

This is partly due to fragility fractures being under-recognised and under-prioritised in many primary care consultations. The severity of fragility fractures is often underestimated among primary care physicians¹⁰⁹ and management of fracture risk factors frequently appears to fall to the sidelines in light of the person's other, often serious, care needs.^{92 98 110 111}

Gaps in evidence and a lack of national consensus on best practice for identifying people at high risk of a fracture likely contribute to a wide variation in clinical practice.⁹⁴ The early detection of osteoporosis, such as it happens, is mostly through opportunistic case finding (e.g. on a person-by-person basis), rather than the systematic assessment of people with risk factors. Currently, screening for osteoporosis is not reimbursed in the EU, but Poland is planning to launch a national screening programme for osteoporosis in 2023.¹¹²

Furthermore, in many countries, primary care professionals are not adequately equipped to identify and manage people at high risk of a fragility fracture. Barriers include gaps in understanding of when and how to investigate fracture risk and a lack of incentives to encourage detection.^{97 98} As a result of low levels of knowledge, primary care physicians may be uncertain about the safety and effectiveness of these tools and medications,^{98 109} hindering their ability to implement guideline-recommended care.¹¹³ In addition, in some countries including Spain, there is no consensus or clear guidance on the risk assessment tools and criteria to be used to support primary care professionals in initiating treatment.¹¹⁴

What needs to be done?

It is crucial that policymakers support the development of clear national guidance on identifying people with osteoporosis, which is informed by national scientific consensus. The current evidence base for screening is inconclusive¹¹² but, as it evolves, policymakers must develop a position on which groups should be assessed, which healthcare professionals should be involved (including a possible role for pharmacists) and how the results should be interpreted. Guidance should be developed in collaboration with leading clinicians and academics.

Primary care professionals must be provided with the training, support and tools they need to effectively identify and manage people at risk of osteoporosis and fragility fractures. Osteoporosis and fragility fractures should be included in all educational curricula for healthcare professionals. Training should include risk assessment tools developed for use in primary care, appropriate referral pathways, and tools to support decisions on treatment which take into account the other conditions and treatments that a person may be managing.

Osteoporosis and fragility fractures must be integrated into existing person-centred care models with proven effectiveness. These models include, for example, frameworks for the comprehensive management of the older and frail population, such as the CGA.¹¹⁵⁻¹¹⁷



Preventing any kind of fragility fracture from occurring in the first place is a huge opportunity – both in terms of maintaining people's quality of life and sparing health systems and society the costs and lost productivity these fractures cause.



**CYRUS COOPER,
INTERNATIONAL OSTEOPOROSIS
FOUNDATION**



Healthy Kinzigtal
(Gesundes Kinzigtal),
Germany

3. Getting people back on track: facilitating multidisciplinary care post-fracture



Five things you need to know

1. People who have sustained a fragility fracture are at five times greater risk of having a second fracture within one year.¹¹⁸ It is crucial to identify these people and prevent subsequent fractures.
2. European health systems have so far failed to close the osteoporosis treatment gap; most people who are eligible do not receive the risk-reducing treatment they need.^{3,44}
3. Excellent care and rehabilitation following a fracture, involving a multidisciplinary team of orthopaedics, traumatologists, geriatricians, nurses, physiotherapists and other health professionals, is the first step to ensuring positive outcomes.^{1, 119}
4. There are effective models for multidisciplinary, coordinated post-discharge care to reduce long-term fracture risk, but the quality and accessibility of those services vary widely across Europe.¹⁹
5. Investment in proven best-practice models is needed across Europe to increase access to high-quality post-discharge care and improve long-term patient outcomes.

What is it and why is it important?

The care people receive in hospital following a fragility fracture will impact on their recovery and their independence after discharge.¹⁶ Among people with hip fractures, up to 10% are likely to die while in hospital, and only half will regain the same function that they had before the fracture.¹²⁰ This can, in part, be remedied through the implementation of best-practice in-hospital care.¹⁶

Following treatment of a fragility fracture, it is vital that patients have access to services that can prevent subsequent fractures. People who have sustained a first fragility fracture are at significantly higher risk of a subsequent fracture once they have been discharged, including more severe fractures in other parts of the body.¹ Services to prevent subsequent fractures may involve osteoporosis screening, initiation of treatment and referral to specialist services such as rehabilitation and falls prevention programmes. In addition to specialist services, primary care should be involved in the long-term management of fracture risk.⁹⁵

How do we know it works?

There are various components of in-hospital care that have a significant impact on outcomes including the risk of subsequent fractures and death.^{1, 119} International guidelines for the management of fragility fractures in hospitals include standards for time to surgery, assessment of future risk and early introduction of post-fracture rehabilitation.¹⁶ In addition, a crucial component of in-hospital post-fracture care is the delivery of orthogeriatric services, which involve orthopaedics, geriatrics and other specialties working together to care for fracture patients.^{17, 18} For example, timely surgery and coordinated treatment plans led by orthogeriatricians have been shown to significantly reduce the risk of death in the short- and long-term and the likelihood of complications and prolonged hospital stays.¹⁶ In addition, orthogeriatric services can reduce the length of hospital stay and the need for rehabilitation services, resulting in considerable cost savings.¹²¹



Without the implementation of integrated post-fracture care, patients are left to fracture again.



KASSIM JAVAID, OXFORD UNIVERSITY HOSPITAL

Case study

Multidisciplinary hip fracture unit at Careggi University Hospital, Italy

Case study

Orthogeriatric service, Ireland

Case study

Fracture liaison service at Lille University Hospital, France

Existing and proven models of integrated care seek to assess fracture patients in hospital settings and support the coordination of their care and prevention, both before and after they have been discharged. FLS, for example, are a widely implemented coordinator-based model of care aiming to identify people at risk of subsequent fractures and signpost them to preventive follow-up care services.¹²² This model of care has been recently noted by the EC's Expert Panel on Effective Ways on Investing in Health as an innovative model.¹²³ While there is considerable variation in the services delivered by FLS, they generally include at least one of three key components: identification, investigation and initiation of interventions.¹⁰ Not surprisingly, FLS models that deliver more of the key components result in a greater proportion of people being investigated for osteoporosis and initiated on treatment.¹²⁴

What is the current situation?

Alarming, across Europe, most people do not receive risk-reducing treatment after a first fracture, significantly increasing the likelihood of sustaining a subsequent fracture. Depending on the country, 60–85% of women with osteoporosis do not receive treatment within the first year after a fracture.¹ A recent study from Germany, for example, showed that doctors in orthopaedic and trauma departments failed to diagnose osteoporosis in 70% of fracture patients, leaving them untreated and at risk of another fracture.¹²⁵

Implementation of multidisciplinary, integrated models of care varies within and between countries.

Very few hospitals appear to have structured services in place to prevent a subsequent fracture. Finland has developed nurse-led post-fracture services, which are recommended in national guidelines.^{93 126} In Germany, however, only a minority of hospitals have a referral pathway for post-fracture patients in place, leaving up to 88% of patients discharged without clear treatment recommendations.^{125 127} In Romania, post-fracture follow-up investigation and treatment is usually not carried out in the hospital where the fracture was treated, but must be initiated in primary care and then undertaken by a specialist,¹²⁸ contributing to some people who are eligible for treatment not receiving it.³ In 2013, only eight EU countries (Austria, Cyprus, Czech Republic, Estonia, Finland, Hungary, the Netherlands and Sweden) had FLS in over 10% of hospitals, while six countries (Greece, Latvia, Luxembourg, Portugal, Romania and Slovakia) had FLS in under 1% of hospitals.⁴⁴

Osteoporosis can be debilitating and requires a holistic approach: treatment of the disease and care for the person.

**MARIA TERESA PARISOTTO,
EUROPEAN SPECIALIST NURSES
ORGANISATION**

The resources required to initiate new services may be perceived as a barrier to implementation. Referral services such as FLS are consistently shown to be cost-effective and sometimes cost-saving.¹⁹ Considerable investment is required, however,¹²⁹ which may deter policymakers from making investment decisions in a climate of increasing pressure on healthcare budgets and competing disease areas that need to be addressed.¹³⁰

There are several best-practice case studies at the national level from which other countries can learn. The UK provides valuable lessons in terms of driving best-practice delivery of orthogeriatric care of hip fracture patients. Its National Hip Fracture Database, which is used to audit hospital performance in hip fracture care and prevention of a subsequent fracture,⁹⁰ has been instrumental in supporting improved management of hip fractures in hospital. The Best Practice Tariff, a financial incentive scheme, has also had a considerable impact on achievement of best-practice standards.¹²⁰ A similar incentive scheme has recently been introduced in Ireland, and is supporting improved outcomes in people with hip fractures.¹³¹ Orthogeriatric care models have been established in various countries, including Spain, Germany and the Netherlands, although practice and outcomes vary significantly between hospitals.^{86 132-136}

Important efforts are also underway to promote the establishment of FLS globally and to ensure greater adherence to best-practice standards. To this end, a global recognition scheme, IOF Capture the Fracture®, has been developed.¹³⁷ Its best-practice framework sets out quality standards to prevent subsequent fractures and provides a suite of resources to support their implementation in different healthcare settings.¹²² Within the first year, 60 hospitals signed up for the scheme, of which 27 achieved a gold rating, the highest recognition.¹³⁸

What needs to be done?

Policymakers should ensure the implementation of best-practice in-hospital care for fracture patients so that people can quickly regain their independence and mobility. Options for encouraging widespread implementation of best-practice care should be considered, including the possible use of incentives to encourage clinicians to deliver specific components of high-quality care.

Policymakers need to support coordination between existing services, to ensure more patients have access to multidisciplinary care models such as FLS.¹⁰ This will ensure patients at high risk of a fracture benefit from the seamless transition to follow-up care and receive all necessary services. This will require consistent collaboration between primary care, orthopaedics, rheumatologists, geriatrics and other services.¹⁰

Case study

Hip fracture best practice tariff, England, UK

Case study

Pharmacist-led clinical pathway, Belgium

4. Supporting quality of life as part of healthy and active ageing: prevention of falls and fractures in later life



Five things you need to know

1. The consequences of fragility fractures are more severe in the older population, often resulting in reduced independence, immobility or transition into long-term care.^{32 33 120}
2. Maintaining quality of life and supporting the mobility and independence of older people must be a priority for care planning and health promotion in this population.
3. Services that aim to prevent falls must be coordinated with multidisciplinary and comprehensive fracture prevention services. They should consider the complex needs of the older population and reflect other personal risk factors, such as balance and potential trip hazards in the home.^{32 139}
4. Simple interventions – such as modifications at home or in a long-term care setting – can prevent falls and therefore the risk of fracture.^{32 140} All too often, however, these needs are not identified or addressed.
5. Innovative falls prevention programmes have been established in various European countries and should be made available to all older people at risk of falls and associated fractures.^{32 140 141}

What is it and why is it important?

In the older population, falls are an important risk factor for major fractures and often mark a watershed moment in rapid deterioration of health and functioning.^{32 33}

Among women, 80% of fractures occur over the age of 70 and, of these, 90% are the result of a fall.¹²⁰ After the first fall, people often become afraid of falling again, leading to reduced strength and mobility and further increasing the risk of subsequent falls.¹⁴² For older people, major fragility fractures can result in rapid physical decline even with best-practice care in hospital. The risk of dying in the first year after a hip fracture can be as high as 28% for people over the age of 60.^{36 143 144} In many cases, a major fragility fracture marks the end of independent living: one in four hip fracture patients who were previously independent are discharged to a care home.¹²⁰

Integrating falls prevention and promotion of bone health into health and social care services could help older people maintain their independence and enhance their quality of life.^{16 139 144} Given the high costs of falls and care for associated fractures, often in residential care settings, prevention provides an opportunity to save costs for health and social care.¹⁴⁵

This involves a comprehensive assessment including the risk of falls and interventions to adequately respond to a person's care needs.^{16 146 147} Key measures to prevent falls and fractures comprise: multimodal exercise, including strength resistance training; a critical review of current medication; and initiation of treatment for osteoporosis and other conditions which may increase the risk of falls.¹³⁹ The assessment should also include an analysis of behavioural and environmental aspects which have led to the fall, and the removal of potential hazards that could cause the fall such as inadequate handrails, poor lighting and inappropriate footwear.^{139 144}



Fragility fractures are often just as life-changing for the close family member or friend who must become a carer – they often feel unprepared for the role and may struggle to access information and support. In most cases, they are also older adults who may have health concerns and care needs themselves.



NADIA KAMEL, EUROCARERS



Particularly for very old people, an osteoporotic fracture can be the straw that breaks the camel's back. A fracture may lead to loss of independence either through loss of function, pain or simply loss of confidence. Even good rehabilitation may fail. Positive preventive action to at-risk individuals must be a priority.

**CLIVE BOWMAN,
SCHOOL OF HEALTH SCIENCES,
CITY, UNIVERSITY OF LONDON**



How do we know it works?

Multidisciplinary care – including early comprehensive rehabilitation, adaptation of the living environment and ongoing support to promote functioning and independent living – is key to preventing future falls. This includes strengthening muscles and improving balance, reducing the burden of polypharmaco-therapy and psychotic drugs,²⁰⁻²² addressing psychological factors such as depression²² and improving safety of the living environment. A large study in German care homes, for example, showed that regular weight-bearing and balance exercise with participants reduced the likelihood of falls by 20% and the number of hip fractures by 18%.¹⁴⁰ A safer living environment, including home adaptations and the use of aids and supportive devices such as hip protectors, further contributes to reducing risk of falls.¹⁴⁸

What is the current situation?

In recent years, falls prevention has received increasing attention as part of European healthy ageing policy.^{32 115 149 150} Various falls and fracture prevention programmes have contributed to the development of new models of care and monitoring for older people. The European Innovation Partnership on Active and Healthy Ageing (EIP on AHA) was launched in 2012 to respond to the demographic challenges Europe is facing. Several programmes have been launched as part of its Action Group on personalised health management and prevention of falls, such as ProFouND, an initiative promoting exercise and adaptation of the physical environment.³² ADVANTAGE, a European Joint Action of 22 Member States and more than 33 organisations, is developing a common approach to managing frailty in health and social care in the Member States. It encompasses a range of activities, including the use of technology to enable the detection of frailty-related symptoms and events such as falls.¹¹⁵ Similarly, the European long-term study FrailSafe is assessing the use of wearables, sensors and telemedicine to foster self-management and prevent falls.¹⁵⁰

At national level, some countries have been spearheading services and tools to support healthcare professionals and patients in managing frailty and preventing falls, but access often appears to be limited.^{151 152} Best-practice examples include the use of smartphone-based CGA and falls prevention programmes in Germany,¹⁵³ though they are not yet widely implemented.^{92 154} In Scotland, a multifactorial risk assessment and action plan to improve bone health in care homes improved outcomes significantly where it was used and, in some cases, falls were reduced by around 36%.¹⁵² The ongoing Dutch Nijmegen Falls Prevention Program, a five-week exercise programme for people at high risk of falls, has reduced falls by 46%.¹⁴¹ Innovative technologies, such as a wearable device to assess falls risk in real time, are also being developed.¹⁴²

What needs to be done?

Policymakers must ensure comprehensive falls risk assessment and management is widely available and easily accessible to people and healthcare professionals. The complex health status of older people often requires a range of care needs to be addressed. Tools to assess mobility along with other health needs should be integrated in clinical practice but can also be used by older people for self-assessment, freeing-up healthcare resources and extending access to more people at risk of falls.¹⁵⁵

Policymakers must enable and adequately fund collaboration between health and social care services. Falls and fracture prevention requires an integrated and person-centred model supported by a multidisciplinary team, involving each member as and when necessary. Geriatricians and specialist nurses must coordinate with physiotherapists and occupational therapists to improve the person's mobility through exercise programmes and assistive devices, with primary care professionals and pharmacists for medication review and continuous monitoring, and with social care to adapt the physical environment.³² Patients and their informal carers should be considered equal partners in planning and implementing this multi-component approach. Public awareness of falls must also be increased to encourage engagement with preventive measures before the first fall.¹⁴²

Case study

Falling Past Time (Vallen Verleden Tijd), the Netherlands



Health systems in Europe are beginning to recognise the need for older people to stay living in their homes for as long as possible. Falls are one of the biggest threats to maintaining independence.

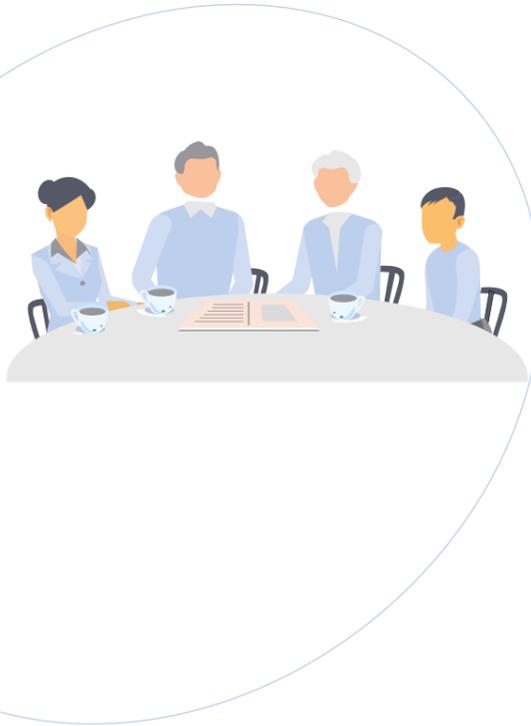
JAN VAN MEGEN, ARJO



Case study

Tread Safely (Trittsicher), Germany

5. Engaging patients and public: awareness, activation and self-management



Five things you need to know

1. People need to understand their risk of osteoporosis and fragility fractures, to ensure they are enabled to seek early diagnosis and care.¹⁵⁶
2. Misconceptions about osteoporosis are common and even those at high risk often underestimate the seriousness of the disease and the danger of sustaining a fragility fracture.^{70 157 158}
3. Lack of knowledge significantly contributes to a large proportion of people with osteoporosis discontinuing their treatment, which is one of the main barriers to improving bone health.²⁷
4. Across Europe, public awareness campaigns and patient/professional associations have been fighting for the recognition of osteoporosis as a serious condition.^{10 159-162}
5. Policymakers need to make sure people are given clear information about fragility fracture prevention that enables them to take an active role in maintaining their bone health and reducing their risk of sustaining a fracture.⁹⁴

What is it and why is it important?

Public awareness of osteoporosis and fragility fractures is key to ensuring people recognise their risk of fracture and seek healthcare professional advice. Unless a fracture has already occurred, proactive investigation of fracture risk is often undertaken only when key risk factors are noted by health and social care practitioners or by people themselves.¹⁵⁶ By improving awareness of the risk factors for osteoporosis and related fractures, as well as increasing understanding of the potential consequences of leaving osteoporosis untreated, more people may be empowered to seek early diagnosis and treatment.²³ This may be particularly important for men as their risk of osteoporosis is often underestimated,¹⁶³ contributing to a situation whereby men who sustain a hip fracture are less likely to receive osteoporosis medication to prevent subsequent fractures.¹⁶⁴

People with osteoporosis can reduce their risk of fracture when they actively engage with their own care. This can involve changes to lifestyle and the living environment and continuing to take the medications prescribed for them.^{94 165} To achieve this, people need information on osteoporosis and fracture risk, the risks and benefits of medication, self-management and the role of DXA scanning and follow-up.²³ In addition, providing care that responds to people's preferences is essential to improving outcomes. It is therefore important that therapy is adapted to individual care needs.¹⁰

The population at risk of fracture is diverse, and inequalities in medication use are apparent. An international review found that personal factors such as age, education and the presence of other long-term conditions, as well as systemic factors such as national insurance and co-payments, contribute to variation in the likelihood of patients continuing to take their medication.¹⁶⁵



A huge part of the responsibility for managing osteoporosis lies with the patient – we need to make sure they have all the information and resources they need to successfully reduce their risk of sustaining a fragility fracture.



**PENILLA GUNTHER,
FORMER MP, SWEDEN**

Case study

Tomorrow and Always (Mañana y Siempre), Spain

How do we know it works?

Improved public education and awareness can help support both identification and management of osteoporosis.^{23 165} Comprehensive management programmes which include education can support increased investigation of osteoporosis, leading to a reduction in hip fractures among older women.¹⁶⁶ Following diagnosis, patient education programmes may also encourage more people to stay on treatment.¹⁶⁷

To support people to continue taking their medication and maintain lifestyle changes in the long term, it is necessary to tailor their treatment plan as much as possible. In addition to a bone healthy diet and exercise, there are numerous pharmacological treatment options for osteoporosis, ranging from daily tablets to annual injections, and it has been shown that less frequent dosing improves the likelihood that people will continue to take their medication.^{10 165} A systematic review found that age and the presence of other chronic conditions impacted on the extent to which people continued to take their medication as prescribed by their clinician.²³ It is important that people are prescribed the most appropriate option and that this is determined based on shared decision-making.¹⁰

What is the current situation?

Across Europe, much of the general population appears to be either misinformed or unaware of osteoporosis and its associated fracture risk. Osteoporosis is often wrongly viewed as a natural consequence of ageing that cannot be averted.²⁷ Even those at high risk – including people already diagnosed with osteoporosis – often underestimate the danger of sustaining a fracture.²⁷ As a result, people at risk of fracture may not be detected or begin treatment until they have sustained a fracture.

Autonomy is very important to older people. It's not about telling them that they can live longer, but if we tell them they will be able to walk without pain for longer, that can make a real difference.

DIDIER POIVRET, CENTRE HOSPITALIER REGIONAL METZ-THONVILLE

Incorrect information in the media may have contributed to low prioritisation of osteoporosis and misconceptions about the safety of treatments.^{70 157} It has been noted, for example, that some people neglect to take their osteoporosis medication due to fear of side effects, despite these being rare.¹⁵⁸

In some countries, civil society is engaged in raising awareness of osteoporosis and fragility fracture risk to address misconceptions and general low levels of understanding around osteoporosis.¹⁰ Organisations such as the Research and Information Group on Osteoporosis (Groupe de recherche et d'information sur les osteoporosis) in France,¹⁶⁰ the Spanish Association for Osteoporosis and Osteoarthritis (Asociación Española con la Osteoporosis y la Artrosis) in Spain,¹⁶¹ the Royal Osteoporosis Society in the UK¹⁵⁹ and others aim to increase public awareness and produce resources for patients and the public such as posters and leaflets. The IOF operates a dedicated website with resources including patient stories and an osteoporosis risk check for self-assessment.¹⁶⁸ Related events and campaigns, including World Osteoporosis Day, are also featured on the website.¹⁶²

What needs to be done?

Awareness of osteoporosis and fragility fractures as a serious health concern must be improved. The reach and impact of existing awareness efforts, which are primarily operated by civil society organisations, should be expanded and supported by governments. Campaigns should be used to debunk myths and clearly outline the personal cost of inaction.

Policymakers must prioritise the delivery of person-centred care. Such care should tailor risk-reducing treatment to an individual's circumstances, to ensure patient satisfaction and facilitate people continuing to take their treatment and maintain lifestyle changes in the long term.

It can be quite a shock to find out that you have osteoporosis, especially if you haven't had a fracture yet. It can be difficult to understand where it is coming from and it might mean you need to make quite a few changes to your life to manage your risk factors.

PAULIINA TAMMINEN, FINNISH OSTEOPOROSIS ASSOCIATION

Case study

Osteoporosis course, Finland

Case studies

Map of best-practice case studies



Pharmacist-led clinical pathway

A pharmacist-led clinical pathway was implemented to ensure people with fragility fractures received appropriate testing and treatment.



What does the programme involve?

In order to standardise care for fragility fracture patients, a hospital pharmacist initiated and led a clinical pathway for fragility fractures in collaboration with a multidisciplinary team.¹⁶⁹ The pathway required that all people admitted to the orthopaedic ward with a fragility fracture receive testing for osteoporosis and treatment when appropriate. The pharmacist also gave patients advice on medications and was responsible for managing the programme and following-up with patients.¹⁶⁹

This new clinical pathway was implemented in AZ Sint-Jan hospital, where a range of other clinical pathways are in place.¹⁷⁰ As part of the Clinical Pathways Network,¹⁷¹ AZ Sint-Jan has set a goal of developing dedicated clinical pathways for 60% of hospital patients.¹⁷⁰



What has the programme achieved?

In-hospital management of fragility fractures improved significantly after the clinical pathway was implemented.¹⁶⁹ More DXA scans were conducted, leading to an increase in osteoporosis diagnoses.¹⁶⁹ There were also increases in the number of people who were referred to a specialist (orthopaedics, geriatrics or rheumatology) and in prescription of appropriate osteoporosis medications.¹⁶⁹



What lessons can be learnt from this programme?

In-hospital care of people with fragility fractures can be significantly improved by the implementation of a dedicated pathway. Such pathways can ensure that fragility fractures are managed consistently by all specialists, and that people receive investigation and appropriate treatment for osteoporosis.

Pharmacists may be well-positioned to identify gaps in care and initiate improvements. In some contexts, they may also be able to oversee the delivery of care improvement initiatives.

Osteoporosis course

The Finnish Osteoporosis Association trains health and social care professionals to deliver osteoporosis rehabilitation courses.



What does the programme involve?

To support self-management and rehabilitation following a fracture, healthcare providers such as physiotherapists are trained to deliver five-session courses for people with osteoporosis.¹⁷² The course addresses a range of topics, such as living with osteoporosis, lifestyle factors to support bone health and preventing falls. Activities include educational sessions, exercises and individual goal setting.^{172 173}

Finnish Osteoporosis Association (Suomen Luustoliitto) operates this programme and provides free training for the health and social care professionals who want to deliver the course.¹⁷² It also provides support for courses across the country, including course materials and online participant information.¹⁷³ The Finnish Osteoporosis Association is the only organisation in Finland that offers this type of programme for osteoporosis.⁹³



What has the programme achieved?

The healthcare-provider-led osteoporosis courses have empowered people with osteoporosis to make the behavioural changes they need to prevent falls and fractures. The course is currently available in three cities across Finland, with around 100 people taking part every year.¹⁷² Most osteoporosis patients who participated reported making changes to their lives to improve their bone health or prevent falls, and many feel more confident about the future and more able to function without being limited by osteoporosis.¹⁷² In addition to impacting on their management of osteoporosis and quality of life, attending the course has encouraged many older people with osteoporosis to go out more often and to become more involved in community activities.^{173 174}

Healthcare professionals benefit from the training they receive.^{173 174} Those who have delivered the course report having improved knowledge and confidence around osteoporosis and finding the course easy to deliver.^{173 174}



What lessons can be learnt from this programme?

People with osteoporosis can experience a range of benefits from educational programmes that help them prevent falls and fractures, and empower them to be more active. When healthcare providers are trained to deliver them, such programmes can be rolled out in communities nationwide.

Fracture liaison service at Lille University Hospital

This FLS is successfully identifying fracture patients and supporting them, with the aim of preventing subsequent fractures.



What does the programme involve?

This FLS, active since 2016, includes both an inpatient and outpatient pathway.¹⁷⁵ Eligible people are identified in the orthopaedic or emergency departments or are referred by their primary care physician. Once referred, participants receive a range of assessments including blood tests and a DXA scan. Those who are diagnosed with osteoporosis are prescribed medication and followed-up within 6–12 months.¹⁷⁵



What has the programme achieved?

In its first two years, this FLS performed well in terms of identifying eligible patients and managing the care of those who attended the service.¹⁷⁵ Around three in four people who had been admitted to the orthopaedic unit with a hip fracture were identified by the FLS. Nearly all patients who attended the service had a DXA scan and blood test, and osteoporosis treatment was prescribed for 94.9% of patients.¹⁷⁵ This FLS is registered with the Capture the Fracture[®] programme.¹⁷⁶

However, low attendance is a key challenge for this service.¹⁷⁵ Fewer than half (45%) of those who were referred attended the FLS.¹⁷⁵



What lessons can be learnt from this programme?

An FLS can support effective identification and management of people who have sustained a fragility fracture and are at risk of subsequent fractures. By including an outpatient pathway into the service, people who have sustained fragility fractures which do not require hospitalisation can be treated before a more serious fracture occurs. However, engagement with FLS is an ongoing challenge, and more effective strategies are needed to encourage participation in these services.

Healthy Kinzigtal (Gesundes Kinzigtal)



Healthy Kinzigtal is a comprehensive population-based integrated programme that aims to improve the experience of care for people with chronic diseases and reduce costs.



What does the programme involve?

Healthy Kinzigtal includes fragility fracture prevention as part of a wider programme which delivers chronic disease care through multidisciplinary teams. The teams collaborate with non-medical services such as gyms and workplace health providers. The aim is to support people with chronic diseases in self-management through close collaboration with their chosen 'physician of trust'. Regular 'geronto-pharmaceutical consultations' support physicians in managing the complex needs of people with multiple conditions, including those with osteoporosis.

Healthy Kinzigtal applies an innovative payment model to incentivise the delivery of best-practice care. In addition to fee-for-service payments, physicians are reimbursed for services providing additional value such as physical training in long-term care settings to prevent falls. Service providers also receive a share of the company's revenue.



What has the programme achieved?

Initial assessments suggest that this programme is effective in improving osteoporosis care. So far, the number of people living with fragility fractures has been 10% lower than in those who received routine care.¹⁷⁷ At the same time, the project has been able to improve patient satisfaction and demonstrate cost savings each year, with savings of USD \$38.2 million between 2007–2014.¹⁷⁷



What lessons can be learnt from this programme?

The programme highlights the impact of a wide cross-sectoral partnership on fragility fracture prevention and cost savings. It presents a feasible and cost-effective approach to provide tailored care for people with chronic conditions, including osteoporosis, while improving patient outcomes and satisfaction.

Tread Safely (Trittsicher)

Tread Safely was developed to improve bone health and mobility of older people in rural areas.



What does the programme involve?

Tread Safely runs falls and fracture prevention programmes. The programme, which is also known as the osteoporotic fracture prevention programme in rural areas (OFRA), comprises three elements: an assessment of bone health, including a DXA scan; mobility exercise classes; and consultations about how to reduce the risk of falls in houses and on farms.

The programme was developed following an assessment of local needs and priorities, and is implemented by an innovative collaboration of local partners.¹⁵⁴ It was based on findings from a survey of local residents which identified loss of independence through disabling falls and accidents as a key concern.¹⁷⁸ It is funded by a regional insurance fund and run in collaboration with two rural community organisations.¹⁵⁴



What has the programme achieved?

The programme has received huge demand from the local population, leading to long waiting lists.¹⁷⁹ Since its inception in 2015, more than 2,300 mobility classes have been conducted, with high satisfaction rates among participants.^{178, 180} A first formative evaluation showed that more than half of participants attended all six classes and venues had good accessibility, with participants often having to travel less than 1.7km.¹⁸⁰ The project includes a cluster-randomised study which is evaluating its impact on the number of fragility fractures.¹⁵⁴ First results are expected to be available in early 2020.¹⁷⁸



What lessons can be learnt from this programme?

The project highlights the importance of tailoring programmes for active and healthy ageing to local needs and involving local actors in implementation. Addressing the local people's concerns and collaborating with local institutions that play an important role in community life has likely contributed to the hugely positive response and participation,^{178, 181} which is usually a key barrier to the successful implementation of health promotion programmes.

Orthogeriatric service, Limerick



This orthogeriatric service supported hip fracture patients while they were in hospital and facilitated access to essential post-fracture care. The services were highly effective and led to cost savings.



What does the programme involve?

An orthogeriatric service was implemented at University Hospital Limerick in 2011 as a collaboration between geriatrics and orthopaedic surgery.¹⁸² People who were admitted to the hospital with a fragility hip fracture received a comprehensive geriatric assessment before surgery so that any additional conditions could be managed appropriately.¹⁸² After surgery, they received bone health and falls assessments and were offered a referral to the hospital's FLS.¹⁸² While in hospital, hip fracture patients were seen daily by the geriatric team.¹⁸²



What has the programme achieved?

The service has helped to significantly improve outcomes for people with hip fractures. Following the implementation of orthogeriatric care, there were reductions in the number of days people stayed in hospital, the proportion of people who died within one year and the number of people who needed further rehabilitation.¹⁸² Thanks in part to the success of this programme, University Hospital Limerick is considered a leader for the development of orthogeriatric services in Ireland.¹⁸³

The improvements in patient outcomes reduced the burden on healthcare services, yielding considerable cost savings.¹²¹ The reduced length of hospital stay and reduced need for rehabilitation meant that the cost per hip fracture patient was reduced by over €3,000 compared with before the orthogeriatric service was introduced.¹²¹ Furthermore, people who received care through this service were less likely to be discharged to a long-term care facility.¹⁸² When these savings are factored in, the annual reduction in healthcare costs amounted to more than €1.4 million, which easily offsets the estimated €171,000 required to implement a full-time service.¹²¹



What lessons can be learnt from this programme?

The introduction of an orthogeriatric service can significantly improve outcomes for people with hip fractures. In turn, these improved outcomes can lead to considerable cost savings in both acute and long-term care.

Multidisciplinary hip fracture unit at Careggi University Hospital



Careggi University Hospital has implemented a multidisciplinary hip fracture unit to improve care, decrease the length of hospital stays and reduce post-surgery complications.



What does the programme involve?

Established in 2011, this multidisciplinary unit aims to address the needs of older people with multiple chronic conditions who have had a hip fracture.¹⁸⁵ Every person who is admitted to the hospital with a hip fracture undergoes a comprehensive series of tests soon after admission, allowing the medical team to identify conditions that may introduce additional risks and to select the most appropriate treatment strategies.^{184 186} Following surgery, physiotherapists support early mobilisation, and osteoporosis treatment is often prescribed.¹⁸⁴



What has the programme achieved?

Implementation of the hip fracture unit has supported improvements in fracture management, health service efficiency and patient outcomes.^{185 186} The proportion of people who have surgery within 48 hours of admission has increased from 26% to 80% since the unit was implemented, and the average length of hospital stay has decreased from 17 to 12 days.¹⁸⁵ There has also been a significant reduction in the rate of deaths, from 3.8% in 2011 to 1.4% in 2016.¹⁸⁵



What lessons can be learnt from this programme?

The quality of hip fracture care and the efficiency of health services can be significantly improved when patients are managed appropriately by a multidisciplinary team. In addition, hip fracture management pathways can effectively incorporate post-surgery care to support the early mobilisation and initiation of osteoporosis treatment.

Falling Past Time (Vallen Verleden Tijd)



This is a five-week exercise programme for adults with a history of falls who live at home.



What does the programme involve?

Falling Past Time involves a range of balance and coordination exercises, which are integrated into an obstacle course to simulate daily life.¹⁴¹ While the original programme was not developed for people with musculoskeletal conditions,¹⁴¹ a multidisciplinary team has since developed a version that is safe for people with osteoporosis.¹⁸⁷



What has the programme achieved?

Falling Past Time has significantly reduced the risk of falls among people with osteoporosis. Clinical trials have found that the programme reduced falls among people with osteoporosis by 39%.¹⁸⁷ When delivered in real-world settings by trained physiotherapists, the programme is still effective, reducing falls among older people by 32%.¹⁸⁸

The programme has now been widely adopted. It is one of five falls prevention programmes recommended by the Ministry of Health, Welfare and Sport,¹⁸⁹ and a two-day training course is available for healthcare professionals who want to deliver the intervention in their own practice.¹⁹⁰



What lessons can be learnt from this programme?

Well-coordinated exercise programmes can significantly reduce falls, a major cause of fragility fractures among people with osteoporosis. Falling Past Time demonstrates the considerable impact such programmes can have on the risk of falls in older people who are at particularly high risk of a serious fracture.

Large-scale implementation of falls prevention programmes is feasible. When physiotherapists or other healthcare professionals are trained to deliver them, these programmes can be rolled out widely, ensuring access for people at risk of falls and potentially reducing the number of fragility fractures in the population.

Tomorrow and Always (Mañana y Siempre)

This is a short film to raise awareness about osteoporosis, featuring popular actors in Spain.



What does the programme involve?

Your Bones. Tomorrow and Always (Tus Huesos. Mañana y Siempre) is a public awareness campaign in Spain, launched by multiple civil society organisations in collaboration with two pharmaceutical companies.¹⁹¹ Central to this campaign is a short film that tells the story of a woman who has been diagnosed with osteoporosis. The story is told from the perspective of her young granddaughter and shows the impact of the condition on the whole family.¹⁹¹ The film stars a popular actress, Concha Velasco, and was written and directed by her son, well-known director Manuel M Velasco.¹⁹¹



What has the programme achieved?

The short film was premiered as part of the Valladolid International Film Festival in 2018¹⁹² and has gained considerable media attention. The premiere event, attended by 350 people, was hosted by the president of the Hispanic Foundation for Osteoporosis and Metabolic Bone Diseases (Fundación Hispana de Osteoporosis y Enfermedades Metabólicas Oseas) and included discussion with the film's cast.¹⁹¹ This was covered by media outlets across Spain, which described the film and presented key information about the impact of osteoporosis and the importance of raising awareness.^{193 194}



What lessons can be learnt from this programme?

By securing the endorsement of well-known and trusted figures, and telling a relatable story, national societies can help raise the profile of osteoporosis and fragility fractures while encouraging the public to engage with fracture prevention strategies. This is an example of a public awareness campaign that has drawn positive media attention to osteoporosis and fragility fracture prevention.

Hip fracture best practice tariff

The hip fracture best practice tariff (BPT) is an incentive scheme which aims to encourage hospitals in England to deliver best-practice hip fracture care.



What does the programme involve?

The hip fracture BPT incentivises hospitals to deliver hip fracture care according to national guidelines.¹⁹⁵ The programme, which was introduced in 2010, provides hospitals with a supplemental payment of £1,335 per patient when six quality criteria are achieved.¹⁹⁶ Criteria include: prompt orthogeriatric assessment; prompt surgery; NICE-compliant surgical approach; prompt mobilisation after surgery; not delirious when tested after operation; and returned to original residence by 120 days.¹⁹⁶⁻¹⁹⁸ To achieve BPT standards efficiently and consistently, many hospitals have put in place multidisciplinary models of care, often involving orthogeriatrics.¹⁹⁶



What has the programme achieved?

Hip fracture care has significantly improved since the introduction of the BPT. In the first two years after the BPT was introduced, the proportion of cases meeting all six quality standards increased from 24% to 55%¹⁹⁵ and in 2017, 58% of all cases met BPT standards.¹⁹⁸

As a result, patient outcomes have improved. Improvements have been made in reducing time to surgery, the length of time that people with a hip fracture stay in hospital and the number of deaths.¹⁹⁷



What lessons can be learnt from this programme?

Financial incentives offered by governments may be an effective tool to encourage multidisciplinary care while supporting improvements in acute fracture management and the efficiency of care. Government incentives for best-practice care may not only influence the practice of individual clinicians but could also promote reorganisation of care teams and improve overall fragility fracture care.¹⁹⁶ This may lead to meaningful improvements in a range of patient outcomes and reduce pressure on healthcare systems through shortened hospital stays.¹⁹⁶

Fracture Liaison Service Database

The Fracture Liaison Service Database (FLS-DB) monitors and assesses FLS performance in England and Wales.



What does the programme involve?

In England and Wales, the FLS-DB is a mandatory national audit programme managed by the Royal College of Physicians.¹⁹⁹ Part of the national Falls and Fragility Fracture Audit Programme,¹⁹⁹ the FLS-DB was first used in 2016 to audit secondary fracture services in England and Wales.²⁰⁰ It now assesses service performance against key indicators, and is the only audit of patient-level fracture prevention data in the world.¹⁹⁹



What has the programme achieved?

The FLS-DB provides detailed insights into fracture care in England and Wales, which are used to guide service improvement efforts.²⁰¹ The key finding of the first audit was that services varied in terms of resourcing, identification of cases, investigation of osteoporosis, falls assessment, treatment and monitoring after a fracture.²⁰⁰ In response, specific service improvement recommendations were produced,²⁰⁰ and subsequent reports have detailed how each FLS is performing against key indicators.²⁰²

Available data suggest that FLS are improving each year. The 2017 audit showed improvements against most key performance indicators compared with 2016 data. For example, the proportion of people who were referred for a falls assessment increased from 40% to 46% and the proportion of people who were recommended osteoporosis medication increased from 38% to 43%.¹⁹⁹ However, some indicators of long-term management regressed, highlighting important gaps in care.¹⁹⁹



What lessons can be learnt from this programme?

National audits are instrumental in monitoring the performance of osteoporosis and fragility fracture services, identifying gaps in care, and encouraging continuous improvement.⁸⁶ Management of fragility fractures and prevention of subsequent fractures could be improved by implementing similar national programmes across Europe.



Supporting resources

What are osteoporosis and fragility fractures?

Osteoporosis, which literally means ‘porous bone’, is a systemic disease characterised by reduction in the density of bone tissues. Weakened bone tissues eventually lead to bone fragility and susceptibility to fracture.⁹⁴ There are several factors that increase the risk of osteoporosis, most importantly age and sex. With advancing age, bone structures become weaker and bone mass decreases progressively; as a result, the proportion of people with osteoporosis increases.^{9,203} Women are far more likely to develop osteoporosis than men, particularly with reduced oestrogen levels after menopause.¹¹ In addition, there are several modifiable risk factors that have a negative impact on bone health such as insufficient physical activity, smoking, high alcohol consumption, low calcium intake and low body weight.^{11,203} Certain medications, such as steroids and breast cancer treatment, have also been associated with an increased risk of osteoporosis.⁹⁴

Osteoporosis is diagnosed based on the assessment of BMD, which refers to the amount of bone mass per unit volume. According to the World Health Organization, osteoporosis is defined by a BMD that lies 2.5 or more standard deviations below the average value for young healthy women aged 20–29. Different techniques are used to assess BMD, but DXA is the most widely used. It is based on the absorption of X-rays and is influenced by bone size and density.⁹⁴

Osteoporosis is one of the main risk factors for sustaining a fragility fracture. The more the BMD value deviates from the standard, the higher the risk of fracture. As bone loss is asymptomatic, the impact of osteoporosis is mostly from associated fractures.²⁰⁴ The most common fragility fractures are hip, spine (vertebral), forearm and upper arm (humeral). Of these, the most extensive health impact – including death – is associated with hip fractures.⁹⁴

A range of other factors also contribute to fracture risk, which must be considered in any assessment to predict the risk of sustaining a fracture.²⁰⁵ A history of fragility fractures and low body mass index (BMI) are important risk factors for fragility fractures, independent of osteoporosis.²⁰⁵ In this context, falls and their associated risk factors such as reduced mobility and vision, cognitive impairments, psychotropic medications, fear of falling and environmental hazards significantly contribute to the likelihood of sustaining a fragility fracture.³²⁻³⁴

Political Q&A

People advocating for the importance of addressing osteoporosis and fragility fractures may face difficult questions from those who are sceptical. Here we provide a set of evidence-based responses to key questions that may arise during these discussions.

1. Isn't osteoporosis a natural part of ageing that cannot be prevented?

This is not true. While bone mass naturally decreases in older age,⁹ osteoporosis and the fractures it can often lead to are not inevitable.²⁴ Preventive strategies such as lifestyle changes and medication can halt the development of osteoporosis and prevent fractures, which can often be life-changing events.²⁴

2. Why should we invest in osteoporosis and fragility fractures when our healthcare budgets are already so overstretched?

Fragility fractures cost EU healthcare systems over €37 billion per year.³ This is higher than for many other diseases including stroke (€20 billion) and chronic obstructive pulmonary disease (€19 billion).^{3,5} Preventing these fractures could reduce overall spending on healthcare.

3. What return can we expect from any extra investment?

Each healthcare system and patient population will require dedicated analysis, but overall the evidence is very promising that treatment can be cost-effective. For example, FLS are consistently evaluated to be cost-effective or even cost-saving.¹⁹ In the UK, for example, it has been estimated that nationwide implementation of FLS could yield savings of £8.5 million over five years.⁶⁴ In Sweden, meanwhile, savings of €60 per patient were made when people took their medication consistently and as prescribed by their clinician; this equates to more than €3 million over 10 years.⁵⁹

4. Shouldn't we invest more in healthy lifestyles to prevent osteoporosis? Why do we also need to invest in care?

Investing in osteoporosis prevention is crucial but we must also support the millions of people who already have osteoporosis and/or have suffered a fracture. By improving the care they receive, we can reduce their risk of a first or subsequent fracture.⁹⁵

5. Osteoporosis and fragility fractures mostly affect older people who do not have many more years to live. Shouldn't we invest in improving the health of younger, economically active people?

Addressing osteoporosis and fragility fractures is important for occupational health and workforce productivity. Absence from work due to osteoporosis is already significant, with more than 7.6 million sick days taken due to fragility fractures in France, Germany, Italy, Spain, Sweden and the UK in 2017.¹ This figure is likely to grow as Europe's population ages.

In addition, the informal care burden that fractures place on friends and family can also impact workforce productivity.^{1,52}

6. Isn't the evidence for osteoporosis screening inconclusive?

The evidence base is still evolving when it comes to widespread screening, but this is not a reason for local practitioners and clinics not to actively seek out undiagnosed and untreated people with osteoporosis. In fact, there is clear evidence that active case-finding of groups with clear risk factors, such as women over 70, can be both feasible and cost-effective.^{15,54}

7. We don't need or want new roles – can't the system just work as it is?

Primary care physicians play a critical role in preventing fragility fractures,⁹⁵ but they cannot be expected to do this alone. They must be able to work closely with healthcare professionals providing in-hospital care for fracture patients, to make sure everyone at risk is identified and followed up, including those who have already suffered from a fracture. This may require changes to current ways of working, but evidence from a range of settings demonstrates that it is both feasible and highly effective.²⁰⁶⁻²⁰⁸

8. Surely you can't prevent older and frail people from falling?

Proven approaches can effectively reduce falls. This includes interventions such as strengthening muscles, improving balance, reducing the impact of multiple medications and making simple changes to a person's living environment.^{20-22,141} A study in Germany, for example, found that regular weight-bearing and balance exercise led to a 20% reduction in falls and an 18% reduction in hip fractures.¹⁴⁰

9. Everyone has heard of osteoporosis, so why do we need to raise awareness?

Misconceptions about osteoporosis are common and come at a high price. Many people think it only affects older women, or underestimate their own risk of a fracture.²⁷ Community education has been shown to be effective in supporting increased investigation of osteoporosis which, in turn, has led to a reduction in hip fractures.¹⁶⁶

10. Patients don't need to know much about osteoporosis – can't they just follow doctors' advice?

Comprehensive programmes which include patient education following diagnosis can encourage more people to stay on treatment.¹⁶⁷

11. Diagnosing osteoporosis requires a bone scan. Is it worth it?

While an official osteoporosis diagnosis must be based on a bone scan, simple risk assessment tools for use in primary care can accurately predict fracture risk and help inform treatment decisions.^{103,104} In many countries, these have been adapted for the local context.²⁰⁹

Key readings

The following list summarises landmark reports and publications, guidance and key initiatives in the area of osteoporosis and fragility fractures in Europe.



Reports

2013 Hernlund *et al.* Osteoporosis in the European Union: medical management, epidemiology and economic burden

2013 Kanis *et al.* SCOPE: a scorecard for osteoporosis in Europe

2016 International Osteoporosis Foundation. Gaps and solutions in bone health: A Global Framework for Improvement

2017 Economist Intelligence Unit. Demystifying ageing: Lifting the burden of fragility fractures and osteoporosis in Asia-Pacific

2017 Harvey *et al.* Mind the (treatment) gap: a global perspective on current and future strategies for prevention of fragility fractures

2018 International Osteoporosis Foundation. Broken bones, broken lives – the fragility fracture crisis in six European countries

2018 Mitchell and Åkesson: How to prevent the next fracture

2019 International Osteoporosis Foundation. Compendium of osteoporosis (2nd edn)

2019 Global Alliance for Musculoskeletal Health. Health policies for integrated prevention and management of non-communicable diseases among OECD countries.



Position papers

2017 European League Against Rheumatism (EULAR). Position Paper on Access to health care for people with rheumatic and musculoskeletal diseases (RMDs)

2017 European League Against Rheumatism (EULAR). RheumaMap. A Research Roadmap to transform the lives of people with Rheumatic and Musculoskeletal Diseases



Guidance

2014 International Osteoporosis Foundation. Capture the Fracture® Best Practice Framework

2017 Lems *et al.* EULAR/EFORT recommendations for management of patients older than 50 years with a fragility fracture and prevention of subsequent fractures

2018 Kanis *et al.* European guidance for the diagnosis and management of osteoporosis in postmenopausal women



Initiatives

2012–ongoing: International Osteoporosis Foundation. Capture the Fracture®

2017–ongoing: International Osteoporosis Foundation. Global Patient Charter

2018 Fragility Fracture Network. Global call to action to improve the care of people with fragility fractures

References

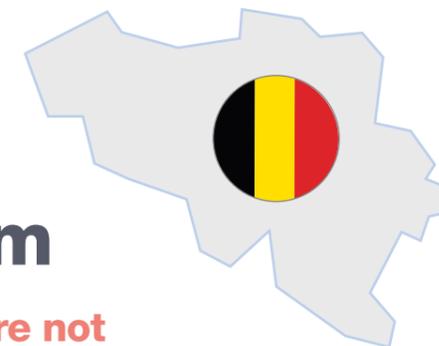
1. International Osteoporosis Foundation. 2018. *Broken bones, broken lives: A roadmap to solve the fragility fracture crisis in Europe*. Nyon: IOF
2. Dreinhöfer KE, Mitchell PJ, Bégué T, et al. 2018. A global call to action to improve the care of people with fragility fractures. *Injury* 49(8): 1393-97
3. Hernlund E, Svedbom A, Ivergard M, et al. 2013. Osteoporosis in the European Union: medical management, epidemiology and economic burden. A report prepared in collaboration with the International Osteoporosis Foundation (IOF) and the European Federation of Pharmaceutical Industry Associations (EFPIA). *Arch Osteoporos* 8: 136
4. Ross PD. 1997. Clinical consequences of vertebral fractures. *Am J Med* 103(2a): 30S-42S; discussion 42S-43S
5. Wilkins E, Wilson L, Wickramasinghe K, et al. 2017. *European cardiovascular disease statistics 2017*. Brussels: European Heart Network
6. European League Against Rheumatism (EULAR). 2017. *RheumaMap. A Research Roadmap to transform the lives of people with Rheumatic and Musculoskeletal Diseases*. Brussels: EULAR
7. Briggs AM, Persaud JG, Deverell ML, et al. 2019. Integrated prevention and management of non-communicable diseases, including musculoskeletal health: a systematic policy analysis among OECD countries. *BMJ Glob Health* 4(5): e001806
8. Sen G, Östlin P, George A. 2007. *Unequal, Unfair, Ineffective and Inefficient: Gender Inequity in Health: Why it exists and how we can change it*. Geneva: WHO Women and Gender Equity Knowledge Network
9. Hannan MT, Felson DT, Dawson-Hughes B, et al. 2000. Risk Factors for Longitudinal Bone Loss in Elderly Men and Women: The Framingham Osteoporosis Study. *J Bone Miner Res* 15(4): 710-20
10. Harvey NC, McCloskey EV, Mitchell PJ, et al. 2017. Mind the (treatment) gap: a global perspective on current and future strategies for prevention of fragility fractures. *Osteoporos Int* 28(5): 1507-29
11. Alswat KA. 2017. Gender Disparities in Osteoporosis. *J Clin Med Res* 9(5): 382-87
12. Salkeld G, Cameron ID, Cumming RG, et al. 2000. Quality of life related to fear of falling and hip fracture in older women: a time trade off study. *BMJ* 320(7231): 341-6
13. McCloskey EV, J. Rathi SH, Blagden M, et al. 2019. *Osteoporosis (op) diagnosis and treatment of women aged ≥70 years in primary care: results from a large european cross-sectional study*. Breda: Amgen
14. Hurtado-Navarro I, Garcia-Sempere A, Rodriguez-Bernal C, et al. 2019. Impact of Drug Safety Warnings and Cost-Sharing Policies on Osteoporosis Drug Utilization in Spain: A Major Reduction But With the Persistence of Over and Underuse. Data From the ESOSVAL Cohort From 2009 to 2015. *Front Pharmacol* 10: 768
15. Shepstone L, Lenaghan E, Cooper C, et al. 2018. Screening in the community to reduce fractures in older women (SCOOP): a randomised controlled trial. *Lancet* 391(10122): 741-47
16. Lems WF, Dreinhöfer KE, Bischoff-Ferrari H, et al. 2017. EULAR/EFORT recommendations for management of patients older than 50 years with a fragility fracture and prevention of subsequent fractures. *Ann Rheum Dis* 76(5): 802-10
17. Grigoryan KV, Javedan H, Rudolph JL. 2014. Orthogeriatric care models and outcomes in hip fracture patients: a systematic review and meta-analysis. *J Orthop Trauma* 28(3): e49-e55
18. Moyet J, Deschasse G, Marquant B, et al. 2019. Which is the optimal orthogeriatric care model to prevent mortality of elderly subjects post hip fractures? A systematic review and meta-analysis based on current clinical practice. *Int Orthop* 43(6): 1449-54
19. Wu CH, Kao IJ, Hung WC, et al. 2018. Economic impact and cost-effectiveness of fracture liaison services: a systematic review of the literature. *Osteoporos Int* 29(6): 1227-42
20. Baranzini F, Poloni N, Diurni M, et al. 2009. [Polypharmacy and psychotropic drugs as risk factors for falls in long-term care setting for elderly patients in Lombardy]. *Recent Prog Med* 100(1): 9-16
21. Kamińska MS, Brodowski J, Karakiewicz B. 2016. The incidence of falls among geriatric outpatients in relation to the number and types of drugs taken. *Family Medicine & Primary Care Review* 18(2): 123-27
22. Kamińska MS, Brodowski J, Karakiewicz B. 2015. Fall Risk Factors in Community-Dwelling Elderly Depending on Their Physical Function, Cognitive Status and Symptoms of Depression. *Int J Environ Res Public Health* 12(4): 3406-16
23. Raybould G, Babatunde O, Evans AL, et al. 2018. Expressed information needs of patients with osteoporosis and/or fragility fractures: a systematic review. *Arch Osteoporos* 13(1): 55-55
24. Cooper C, Westlake S, Harvey N, et al. 2006. Review: developmental origins of osteoporotic fracture. *Osteoporos Int* 17(3): 337-47
25. Harvey N, Dennison E, Cooper C. 2014. Osteoporosis: A Lifecourse Approach. *J Bone Miner Res* 29(9): 1917-25
26. McMillan LB, Zengin A, Ebeling PR, et al. 2017. Prescribing Physical Activity for the Prevention and Treatment of Osteoporosis in Older Adults. *Healthcare (Basel, Switzerland)* 5(4): e85
27. Bombak AE, Hanson HM. 2016. Qualitative Insights from the Osteoporosis Research: A Narrative Review of the Literature. *J Osteoporos* 2016: 7915041
28. Cristea C. 2019. Interview with Taylor Morris and Kirsten Budig at The Health Policy Partnership [telephone]. 02/10/19
29. Tervonen S. 2019. Interview with Taylor Morris at The Health Policy Partnership [telephone]. 03/10/19
30. National Health Service. Osteoporosis. [Updated 18/06/19]. Available from: <https://www.nhs.uk/conditions/osteoporosis/> [Accessed 30/08/19]
31. Sanchez AC, Marine FB, Sanchez AC, et al. 2012. *Menogua: Osteoporosis*. Madrid: Asociacion Espanola para el Estudio de la Menopausia
32. Prevention of Falls Network for Dissemination. 2016. *Falls Prevention Intervention Factsheets*. Manchester: ProFouND
33. Cameron ID, Dyer SM, Panagoda CE, et al. 2018. Interventions for preventing falls in older people in care facilities and hospitals. *Cochrane Database Syst Rev* 9: Cd005465
34. Todd C, Skelton D. 2004. *What are the main risk factors for falls among older people and what are the most effective interventions to prevent these falls?* Geneva: World Health Organization
35. International Osteoporosis Foundation. 2012. *Osteoporosis in Men. The 'silent epidemic' strikes men too*. Nyon: IOF
36. Katsoulis M, Benetou V, Karapetyan T, et al. 2017. Excess mortality after hip fracture in elderly persons from Europe and the USA: the CHANCES project. *J Intern Med* 281(3): 300-10
37. Clerc Liaudat C, Vaucher P, De Francesco T, et al. 2018. Sex/gender bias in the management of chest pain in ambulatory care. *Women's Health (London, England)* 14: 1745506518805641
38. Claréus B, Renström EA. 2019. Physicians' gender bias in the diagnostic assessment of medically unexplained symptoms and its effect on patient-physician relations. *Scand J Psychol* 60(4): 338-47
39. Kurth A. 2019. Interview with Kirsten Budig at The Health Policy Partnership [telephone]. 18/09/19
40. Baggio G, Corsini A, Floreani A, et al. 2013. Gender medicine: a task for the third millennium. *Clin Chem Lab Med* 51(4): 713-27
41. Lems WF, Raterman HG. 2017. Critical issues and current challenges in osteoporosis and fracture prevention. An overview of unmet needs. *Ther Adv Musculoskelet Dis* 9(12): 299-316
42. Johnell O, Kanis JA. 2006. An estimate of the worldwide prevalence and disability associated with osteoporotic fractures. *Osteoporos Int* 17(12): 1726-33
43. Haentjens P, Magaziner J, Colon-Emeric CS, et al. 2010. Meta-analysis: excess mortality after hip fracture among older women and men. *Ann Intern Med* 152(6): 380-90
44. Kanis JA, Borgstrom F, Compston J, et al. 2013. SCOPE: a scorecard for osteoporosis in Europe. *Arch Osteoporos* 8: 144
45. Svedbom A, Hernlund E, Ivergard M, et al. 2013. Osteoporosis in the European Union: a compendium of country-specific reports. *Arch Osteoporos* 8: 137
46. Eurostat. 2017. *People in the EU: Statistics on demographic changes*. Brussels: European Commission
47. Eurostat. 2017. *People in the EU: Statistics on an ageing society*. Brussels: European Commission
48. Nerlich C, Schroth J. 2018. The economic impact of population ageing and pension reforms. *ECB Economic Bulletin* 2: 85-109
49. Eurostat. 2017. *Dataset: Demographic challenges - population projections tables and figures*. Brussels: European Commission
50. Eurostat. 2019. *Dataset: Activity rates by sex, age and citizenship*. Brussels: European Commission
51. Office for National Statistics. 2017. *Sickness absence in the UK labour market: 2016*. London: ONS
52. Strom O, Borgstrom F, Kanis JA, et al. 2011. Osteoporosis: burden, health care provision and opportunities in the EU: a report prepared in collaboration with the International Osteoporosis Foundation (IOF) and the European Federation of Pharmaceutical Industry Associations (EFPIA). *Arch Osteoporos* 6: 59-155
53. Kamel N. 2019. Personal communication by email: 22/10/19
54. Turner DA, Khioe RFS, Shepstone L, et al. 2018. The Cost-Effectiveness of Screening in the Community to Reduce Osteoporotic Fractures in Older Women in the UK: Economic Evaluation of the SCOOP Study. *J Bone Miner Res* 33(5): 845-51
55. Hiligsmann M, Gathon H-J, Bruyère O, et al. 2010. Cost-Effectiveness of Osteoporosis Screening Followed by Treatment: The Impact of Medication Adherence. *Value Health* 13(4): 394-401
56. Hiligsmann M, Evers SM, Ben Sedrine W, et al. 2015. A systematic review of cost-effectiveness analyses of drugs for postmenopausal osteoporosis. *Pharmacoeconomics* 33(3): 205-24

57. Jönsson B, Ström O, Eisman JA, *et al.* 2011. Cost-effectiveness of Denosumab for the treatment of postmenopausal osteoporosis. *Osteoporos Int* 22(3): 967-82
58. Majumdar SR, Lier DA, Hanley DA, *et al.* 2017. Economic evaluation of a population-based osteoporosis intervention for outpatients with non-traumatic non-hip fractures: the "Catch a Break" 1i [type C] FLS. *Osteoporos Int* 28(6): 1965-77
59. Jonsson E, Hansson-Hedblom A, Ljunggren O, *et al.* 2018. A health economic simulation model for the clinical management of osteoporosis. *Osteoporos Int* 29(3): 545-55
60. Majumdar SR, Lier DA, Leslie WD. 2013. Cost-effectiveness of two inexpensive postfracture osteoporosis interventions: results of a randomized trial. *J Clin Endocrinol Metab* 98(5): 1991-2000
61. Majumdar SR, Lier DA, Beaupre LA, *et al.* 2009. Osteoporosis Case Manager for Patients With Hip Fractures: Results of a Cost-effectiveness Analysis Conducted Alongside a Randomized Trial. *JAMA Intern Med* 169(1): 25-31
62. Leal J, Gray AM, Hawley S, *et al.* 2017. Cost-Effectiveness of Orthogeriatric and Fracture Liaison Service Models of Care for Hip Fracture Patients: A Population-Based Study. *J Bone Miner Res* 32(2): 203-11
63. Jonsson E, Borgström F, Ström O. 2016. Cost Effectiveness Evaluation of Fracture Liaison Services for the Management of Osteoporosis in Sweden. *Value Health* 19(7): A612
64. Department of Health. 2009. *Fracture prevention services: An economic evaluation*. Leeds: Department of Health
65. European Commission. 2018. *Health at a glance: Europe 2018: State of health in the EU cycle*. Paris: OECD Publishing
66. Ministry of Health Welfare and Sport. 2019. *The national prevention agreement: A healthier Netherlands*. The Hague: Ministry of Health Welfare and Sport
67. Ministère des Solidarités et de la Santé. 2017. *Stratégie nationale de santé 2018-2022*. Paris: Ministère des Solidarités et de la Santé
68. Ministerio de Sanidad Servicios Sociales e Igualdad. 2014. *Estrategia de promoción de la salud y prevención en el SNS*. Madrid: Ministerio de Sanidad Servicios Sociales e Igualdad
69. Directorate General for Internal Policies. 2017. *Health promotion and primary prevention: exchange of good practices*. Brussels: European Parliament
70. Curtis EM, Moon RJ, Harvey NC, *et al.* 2017. The impact of fragility fracture and approaches to osteoporosis risk assessment worldwide. *Int J Orthop Trauma Nurs* 26: 7-17
71. Eisman JA, Bogoch ER, Dell R, *et al.* 2012. Making the first fracture the last fracture: ASBMR task force report on secondary fracture prevention. *J Bone Miner Res* 27(10): 2039-46
72. Ministero della Salute. 2018. Una strategia di intervento per l'osteoporosi. Available from: http://www.salute.gov.it/portale/news/p3_2_1_1_1.jsp?lingua=italiano&menu=notizie&p=dalministero&id=3365 [Accessed 25/09/19]
73. Ministero della Salute. 2016. Patologie al Femminile. Available from: <http://www.salute.gov.it/portale/donna/menuContenutoDonna.jsp?lingua=italiano&area=Salute%20donna&menu=patologie> [Accessed 25/09/19]
74. Ministère des Solidarités et de la Santé. Ma santé 2022 : un engagement collectif. Available from: <https://solidarites-sante.gouv.fr/systeme-de-sante-et-medico-social/masante2022/> [Accessed 04/11/19]
75. Ali N, Qadery S, Narle G. 2019. *Musculoskeletal Health: 5 year strategic framework for prevention across the lifecycle*. London: PHE publications
76. World Health Organization Regional Office for Europe. 2012. *Strategy and action plan for healthy ageing in Europe, 2012-2020*. Malta: WHO
77. Richardson E, Zalete J, Note E. 2016. *National diabetes plans in Europe: What lessons are there for the prevention and control of chronic diseases in Europe?* Ljubljana: National Institute of Public Health
78. Eurostat. 2018. *Cardiovascular diseases statistics*. Brussels: European Commission
79. Public Health England. 2019. *Healthy beginnings: applying All Our Health*. London: PHE
80. Plantenga J, Remery C. 2015. *The policy on gender equality in the Netherlands; In-depth analysis for the FEMM committee*. Brussels: European Parliament
81. Government of Ireland. 2019. Women's Health Taskforce. Available from: <https://www.gov.ie/en/campaigns/-womens-health/> [Accessed 18/11/19]
82. WHO Regional Office for Europe. 2016. *Strategy on women's health and well-being in the WHO European Region*. Copenhagen: WHO Regional Office for Europe
83. Cooper C, Ferrari S. 2017. *IOF Compendium of osteoporosis*. Nyon: International Osteoporosis Foundation
84. Mitchell P. 2019. Personal communication by email: 09/10/19
85. Fragility Fracture Network Greece. 2019. Available from: <https://ffngr.wordpress.com> [Accessed 10/10/19]
86. Ojeda-Thies C, Sáez-López P, Currie CT, *et al.* 2019. Spanish National Hip Fracture Registry (RNFC): analysis of its first annual report and international comparison with other established registries. *Osteoporos Int* 30(6): 1243-54
87. Johansen A, Golding D, Brent L, *et al.* 2017. Using national hip fracture registries and audit databases to develop an international perspective. *Injury* 48(10): 2174-79
88. Patel NK, Sarraf KM, Joseph S, *et al.* 2013. Implementing the National Hip Fracture Database: An audit of care. *Injury* 44(12): 1934-39
89. Ferguson KB, Halai M, Winter A, *et al.* 2016. National audits of hip fractures: Are yearly audits required? *Injury* 47(2): 439-43
90. Neuburger J, Currie C, Wakeman R, *et al.* 2015. The impact of a national clinician-led audit initiative on care and mortality after hip fracture in England: an external evaluation using time trends in non-audit data. *Med Care* 53(8): 686-91
91. Hilgsmann M, Kanis JA, Compston J, *et al.* 2013. Health technology assessment in osteoporosis. *Calcif Tissue Int* 93(1): 1-14
92. Dreinhöfer K. 2019. Interview with Kirsten Budig at The Health Policy Partnership [telephone]. 18/09/19
93. Holm A, Tamminen P. 2019. Interview with Taylor Morris at The Health Policy Partnership [telephone]. 30/09/19
94. Kanis JA, Cooper C, Rizzoli R, *et al.* 2019. European guidance for the diagnosis and management of osteoporosis in postmenopausal women. *Osteoporos Int* 30(1): 3-44
95. Geusens P, Bours SPG, Wyers CE, *et al.* 2019. Fracture liaison programs. *Best Pract Res Clin Rheumatol* 33(2): 278-89
96. Mendis AS, Ganda K, Seibel MJ. 2017. Barriers to secondary fracture prevention in primary care. *Osteoporos Int* 28(10): 2913-19
97. Seaman AT, Steffen M, Doo T, *et al.* 2018. Metasynthesis of Patient Attitudes Toward Bone Densitometry. *J Gen Intern Med* 33(10): 1796-804
98. Merle B, Haesebaert J, Bedouet A, *et al.* 2019. Osteoporosis prevention: Where are the barriers to improvement in French general practitioners? A qualitative study. *PLoS One* 14(7): e0219681
99. Darba J, Kaskens L, Perez-Alvarez N, *et al.* 2015. Disability-adjusted-life-years losses in postmenopausal women with osteoporosis: a burden of illness study. *BMC Public Health* 15: 324
100. Parsons CM, Harvey N, Shepstone L, *et al.* 2019. Systematic screening using FRAX((R)) leads to increased use of, and adherence to, anti-osteoporosis medications: an analysis of the UK SCOOP trial. *Osteoporos Int*: 10.1007/s00198-019-5142-z
101. Swart KMA, Merlijn T, Netelenbos JC, *et al.* 2018. A closer look at SCOOP: screening for fracture prevention. *The Lancet* 392(10147): 552
102. Bolland MJ, Grey A. 2018. A closer look at SCOOP: screening for fracture prevention. *The Lancet* 392(10147): 551-52
103. Viswanathan M, Reddy S, Berkman N, *et al.* 2018. Screening to Prevent Osteoporotic Fractures: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. *JAMA* 319(24): 2532-51
104. Kanis JA, Harvey NC, Cooper C, *et al.* 2016. A systematic review of intervention thresholds based on FRAX: A report prepared for the National Osteoporosis Guideline Group and the International Osteoporosis Foundation. *Arch Osteoporos* 11(1): 25
105. Lundqvist M, Alwin J, Henriksson M, *et al.* 2018. Cost-effectiveness of comprehensive geriatric assessment at an ambulatory geriatric unit based on the AGE-FIT trial. *BMC Geriatr* 18(1): 32-32
106. Ríos Germán PP, Alarcón T, Ramírez-Martín R, *et al.* 2017. Comprehensive geriatric assessment for identifying older people at risk of hip fracture: cross-sectional study with comparative group. *Fam Pract* 34(6): 679-84
107. Dunnewind T, Dvortsin EP, Smeets HM, *et al.* 2017. Economic Consequences and Potentially Preventable Costs Related to Osteoporosis in the Netherlands. *Value Health* 20(6): 762-68
108. Association Française de Lutte Antirhumatismale (AFLAR), Alliance Nationale Contre L'Osteoporose. 2017. 'Livres Blanc - États Généraux De L'ostéoporose - Pour un plan de santé publique contre les fractures liées à l'ostéoporose'. Paris: AFLAR
109. Flais J, Coiffier G, Le Noach J, *et al.* 2017. Low prevalence of osteoporosis treatment in patients with recurrent major osteoporotic fracture. *Arch Osteoporos* 12(1): 24
110. Bowman C. 2019. Interview with Kirsten Budig at The Health Policy Partnership [telephone]. 16/09/19
111. Puth M-T, Klaschik M, Schmid M, *et al.* 2018. Prevalence and comorbidity of osteoporosis—a cross-sectional analysis on 10,660 adults aged 50 years and older in Germany. *BMC Musculoskelet Disord* 19(1): 144
112. European Network for Health Technology Assessment. 2019. *Screening for osteoporosis in the general population*. Copenhagen: EUnetHTA
113. Merle B, Chapurlat R, Vignot E, *et al.* 2017. Post-fracture care: do we need to educate patients rather than doctors? The PREVOST randomized controlled trial. *Osteoporos Int* 28(5): 1549-58
114. Martínez-Laguna D. 2018. Osteoporosis y Atención Primaria. Como valorar el riesgo de fractura. Utilización de las escalas de riesgo. *Revista de osteoporosis y metabolismo mineral* 10(1): Supplement: 5-8

115. Joint Action European Union. 2019. ADVANTAGE JA -A comprehensive approach to promote a disability-free Advanced age in Europe: the ADVANTAGE initiative. Available from: <https://advantageja.eu/index.php/about-us/what-is-ja> [Accessed 09/08/19]
116. British Geriatrics Society. 2019. 12. CGA in Primary Care Settings: Patients at risk of falls and fractures. Good Practice Guide. Available from: <https://www.bgs.org.uk/resources/12-cga-in-primary-care-settings-patients-at-risk-of-falls-and-fractures> [Accessed 06/08/19]
117. British Geriatrics Society. 2019. 11. CGA in Primary Care Settings: Bone health. Available from: <https://www.bgs.org.uk/resources/11-cga-in-primary-care-settings-bone-health> [Accessed 09/09/19]
118. van Geel TA, van Helden S, Geusens PP, et al. 2009. Clinical subsequent fractures cluster in time after first fractures. *Ann Rheum Dis* 68(1): 99-102
119. Hawley S, Javaid MK, Prieto-Alhambra D, et al. 2016. Clinical effectiveness of orthogeriatric and fracture liaison service models of care for hip fracture patients: population-based longitudinal study. *Age Ageing* 45(2): 236-42
120. Tarazona-Santabalbina FJ, Belenguer-Varea A, Rovira E, et al. 2016. Orthogeriatric care: improving patient outcomes. *Clin Interv Aging* 11: 843-56
121. Shanahan E, Henderson C, Butler A, et al. 2016. Dedicated orthogeriatric service saves the HSE a million Euro. *Ir Med J* 109(4): 385
122. Akesson K, Marsh D, Mitchell PJ, et al. 2013. Capture the Fracture: a Best Practice Framework and global campaign to break the fragility fracture cycle. *Osteoporos Int* 24(8): 2135-52
123. European Commission. 2019. *Task shifting and health system design. Report of the Expert Panel on effective ways of investing in Health (EXPH)*. Luxembourg: EC
124. Ganda K, Puech M, Chen JS, et al. 2013. Models of care for the secondary prevention of osteoporotic fractures: a systematic review and meta-analysis. *Osteoporos Int* 24(2): 393-406
125. Kurth AA, Salzmann M, Stumpf U, et al. 2018. Eine regionale Analyse der Tertiärprävention. *Osteologie* 27(03): 135-43
126. Duodecim. 2018. *Osteoporosi*. Helsinki: Duodecim
127. International Osteoporosis Foundation. 2018. *Broken bones, broken lives: A roadmap to solve the fragility fracture crisis in Germany*. Nyon: IOF
128. Păun D. 2019. Interview with Taylor Morris at The Health Policy Partnership [Telephone]. 11/12/19
129. McLellan AR, Wolowacz SE, Zimovetz EA, et al. 2011. Fracture liaison services for the evaluation and management of patients with osteoporotic fracture: a cost-effectiveness evaluation based on data collected over 8 years of service provision. *Osteoporos Int* 22(7): 2083-98
130. Thurston A. 2019. Interview with Kirsten Budig at The Health Policy Partnership [telephone]. 13/09/19
131. Dutch Institute for Clinical Auditing. 2019. *Annual report 2018: DHFA*. Leiden: DICA
132. National Office of Clinical Audit. 2019. *Irish Hip Fracture Database national report 2018*. Dublin: NOCA
133. Haasters F, Prall WC, Himmler M, et al. 2015. Prävalenz und Management der Osteoporose in der Unfallchirurgie. *Der Unfallchirurg* 118(2): 138-45
134. Jung K, Krause U. 2017. Fünfzigstes AltersTraumaZentrum DGU® zertifiziert. *Orthopädie und Unfallchirurgie* 7(1): 64-65
135. Grund S, Roos M, Duchene W, et al. 2015. Evaluation eines Versorgungskonzepts für die Alterstraumatologie. *Dtsch Arztebl Int* 112(7): 113-19
136. Biber R, Singler K, Curschmann-Horter M, et al. 2013. Implementation of a co-managed Geriatric Fracture Center reduces hospital stay and time-to-operation in elderly femoral neck fracture patients. *Arch Orthop Trauma Surg* 133(11): 1527-31
137. Mitchell P, Åkesson K, Chandran M, et al. 2016. Implementation of Models of Care for secondary osteoporotic fracture prevention and orthogeriatric Models of Care for osteoporotic hip fracture. *Best Pract Res Clin Rheumatol* 30(3): 536-58
138. Javaid MK, Kyer C, Mitchell PJ, et al. 2015. Effective secondary fracture prevention: implementation of a global benchmarking of clinical quality using the IOF Capture the Fracture(R) Best Practice Framework tool. *Osteoporos Int* 26(11): 2573-8
139. World Health Organization. 2017. *Integrated care for older people (ICOPE). Guidelines on community-level interventions to manage declines in capacity*. Geneva: WHO
140. Bundesministerium für Bildung und Forschung. 2011. Training statt Bettruhe verhindert Oberschenkelhalsbrüche. Präventionsmaßnahmen in Pflegeheimen könnten bis zu 40 Millionen Euro sparen. Available from: <https://www.gesundheitsforschung-bmbf.de/de/training-statt-bettruhe.php> [Accessed 20/09/19]
141. Weerdesteyn V, Rijken H, Geurts ACH, et al. 2006. A Five-Week Exercise Program Can Reduce Falls and Improve Obstacle Avoidance in the Elderly. *Gerontology* 52(3): 131-41
142. van Megen J. 2019. Interview with Taylor Morris at The Health Policy Partnership [telephone]. 14/10/19
143. Roche JJW, Wenn RT, Sahota O, et al. 2005. Effect of comorbidities and postoperative complications on mortality after hip fracture in elderly people: prospective observational cohort study. *BMJ* 331(7529): 1374
144. Becker C. 2017. Prävention von Stürzen und sturzbedingten Verletzungen. *Z Gerontol Geriatr* 50(8): 672-75
145. Heinrich S, Rapp K, Rissmann U, et al. 2010. Cost of falls in old age: a systematic review. *Osteoporos Int* 21(6): 891-902
146. Bruce J, Lall R, Withers EJ, et al. 2016. A cluster randomised controlled trial of advice, exercise or multifactorial assessment to prevent falls and fractures in community-dwelling older adults: protocol for the prevention of falls injury trial (PreFIT). *BMJ Open* 6(1): e009362
147. European Innovation Partnership on Active and Healthy Ageing. 2013. *Action Plan A2. 'Personalized health management, starting with a Falls Prevention Initiative'*. Brussels: EIP-AHA
148. Kannus P, Parkkari J, Niemi S, et al. 2000. Prevention of hip fracture in elderly people with use of a hip protector. *N Engl J Med* 343(21): 1506-13
149. EU Falls Festival. 2019. European Falls Festival. Available from: <http://www.eufallsfest.eu/> [Accessed 25/09/19]
150. FrailSafe. 2019. FrailSafe project. Available from: <https://frailsafe-project.eu/> [Accessed 09/08/19]
151. Alonso C. 2019. The ADVANTAGE initiative. A comprehensive approach to promote a disability-free advanced age in Europe. FrailSafe Final Conference; 03/04/19; Brussels
152. Cooper R. 2017. Reducing falls in a care home. *BMJ Qual Improv Rep* 6(1): u214186.w5626
153. Linder. 2019. Linder. Available from: <https://www.linder.de/> [Accessed 09/08/19]
154. Rapp K, Kampe K, Roigk P, et al. 2016. The osteoporotic fracture prevention program in rural areas (OFRA): a protocol for a cluster-randomized health care fund driven intervention in a routine health care setting. *BMC Musculoskelet Disord* 17(1): 458-58
155. Pape HC, Bischoff-Ferrari HA. 2017. How can we influence the incidence of secondary fragility fractures? A review on current approaches. *Injury* 48 Suppl 7: S24-s26
156. Nederlands Huisartsen Genootschap. 2012. *NHG-Standaard Fractuurpreventie*. Utrecht: Nederlands Huisartsen Genootschap
157. Cipriani C, Pepe J, Minisola S, et al. 2018. Adverse effects of media reports on the treatment of osteoporosis. *J Endocrinol Invest* 41(12): 1359-64
158. Khosla S, Cauley JA, Compston J, et al. 2017. Addressing the Crisis in the Treatment of Osteoporosis: A Path Forward. *J Bone Miner Res* 32(3): 424-30
159. Royal Osteoporosis Society. Raise awareness. Available from: <https://theros.org.uk/how-you-can-help/raise-awareness/> [Accessed 07/08/19]
160. Groupe de recherche et d'information sur les ostéoporoses. Présentation du GRIO. Available from: <http://www.grio.org/osteoporose.php> [Accessed 07/08/19]
161. Asocacion espanola con la osteoporosis y la artrosis. Objetivos estrategicos. Available from: <http://www.aecosar.es/objetivos-estrategicos/> [Accessed 07/08/19]
162. International Osteoporosis Foundation. World Osteoporosis Day. Available from: <http://www.worldosteoporosisday.org/> [Accessed 07/08/19]
163. Adler RA. 2006. The need for increasing awareness of osteoporosis in men. *Clin Cornerstone* 8 Suppl 3: S7-13
164. Kiebzak GM, Beinart GA, Perser K, et al. 2002. Undertreatment of osteoporosis in men with hip fracture. *Arch Intern Med* 162(19): 2217-22
165. Fatoye F, Smith P, Gebrye T, et al. 2019. Real-world persistence and adherence with oral bisphosphonates for osteoporosis: a systematic review. *BMJ Open* 9(4): e027049
166. Newman ED, Ayoub WT, Starkey RH, et al. 2003. Osteoporosis disease management in a rural health care population: hip fracture reduction and reduced costs in postmenopausal women after 5 years. *Osteoporos Int* 14(2): 146-51
167. Hilgsmann M, Cornelissen D, Vrijens B, et al. 2019. Determinants, consequences and potential solutions to poor adherence to anti-osteoporosis treatment: results of an expert group meeting organized by the European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO) and the International Osteoporosis Foundation (IOF). *Osteoporos Int*: 10.1007/s00198-019-5104-5
168. International Osteoporosis Foundation. 2019. Osteoporosis Risk Check. Available from: <http://riskcheck.iofbonehealth.org/en/form> [Accessed 09/10/2019]
169. Saey S, Piette Y, Verstraete B, et al. 2018. Building for better bones: evaluation of a clinical pathway in the secondary prevention of osteoporotic fractures. *Eur J Hosp Pharm* 25(4): 210-13
170. AZ Sint-Jan. Klinische paden. [Updated 16/03/17]. Available from: <https://www.azsintjan.be/nl/professionaal/klinische-paden/klinische-paden> [Accessed 21/10/19]
171. Netwerk Klinische Paden. Welkom op de website van het Netwerk Klinische Paden. Available from: nkp.be [Accessed 21/10/19]
172. Luustoliitto. Luustokurssin ohjaajaksi. Available from: <https://luustoliitto.fi/ammattilaisille/luustokurssin-ohjaajaksi/> [Accessed 30/09/19]
173. Luustoliitto. Lahde Mukaan Luustokursille! Available from: <https://luustoliitto.fi/kuntoutuksesta-voimaa-arkeen/luustokurssi/> [Accessed 22/10/19]

174. Luustoliitto. Luustokurssit rohkaisevat liikkeelle kotoa. Available from: <https://luustoliitto.fi/ammattilaisille/luustokurssin-ohjaajaksi/annika-timonen/> [Accessed 22/10/19]
175. Pflimlin A, Gournay A, Delabrière I, et al. 2019. Secondary prevention of osteoporotic fractures: evaluation of the Lille University Hospital's Fracture Liaison Service between January 2016 and January 2018. *Osteoporos Int* 30(9): 1779-88
176. International Osteoporosis Foundation. 2019. Capture the Fracture. Map of best practice. Available from: https://www.capturethefracture.org/map-of-best-practice-page?field_rating_tid=All&country=de [Accessed 30/08/19]
177. Pimperl A, Hildebrandt H, Groene O, et al. 2017. Case Study: *Gesundes Kinzigtal, Germany - Accountable Care in Practice: Global Perspectives*. Durham: Duke University
178. Becker C. 2019. Interview with Kirsten Budig at The Health Policy Partnership [telephone]. 06/11/19
179. Bundesinitiative Sturzprävention. 2018. 3. STURZPRÄVENTIONSTAGUNG D-A-CH. Available from: https://www.physio-deutschland.de/fileadmin/data/bund/events/Sonstige/2018/STURZPR%C3%84VENTIONSTAGUNG_20_21_04_2018_STUTTGART_-_TRITTSICHER.htm [Accessed 07/11/19]
180. Roigk P, Büchele G, Kampe K, et al. 2019. Trittsicher durchs Leben: Analyse von 1092 Bewegungskursen im ländlichen Raum. *Z Gerontol Geriatr* 52(1): 68-74
181. Deutsche Gesellschaft fuer Geriatrie e.V. 2016. PM: Kampagne „Trittsicher durchs Leben“ unterstützt ältere Menschen dabei, lange aktiv zu bleiben. Available from: <https://www.dggeriatrie.de/presse-469/1098-pm-kampagne-%e2%80%99trittsicher-durchs-leben%e2%80%9c-unterst%c3%bctzt-%c3%a4ltere-menschen-dabei> [Accessed 07/11/19]
182. Henderson CY, Shanahan E, Butler A, et al. 2017. Dedicated orthogeriatric service reduces hip fracture mortality. *Ir J Med Sci* 186(1): 179-84
183. National Office of Clinical Audit. Quality improvement focus at the Irish Hip Fracture Meeting 2018. Available from: <https://www.noca.ie/news/quality-improvement-focus-at-the-irish-hip-fracture-meeting-2018> [Accessed 14/11/19]
184. Rostagno C, Cartei A, Buzzi R, et al. 2013. Multidisciplinary approach to hip fracture in the elderly: florence experience. *Emerg Med* 3: 148-52
185. Rostagno C, Cartei A, Civinini R, et al. 2018. Hip fracture unit: beyond orthogeriatrics. *Intern Emerg Med* 13(5): 637-39
186. Rostagno C, Buzzi R, Campanacci D, et al. 2016. In Hospital and 3-Month Mortality and Functional Recovery Rate in Patients Treated for Hip Fracture by a Multidisciplinary Team. *PLoS One* 11(7): e0158607
187. Smulders E, Weerdesteyn V, Groen BE, et al. 2010. Efficacy of a Short Multidisciplinary Falls Prevention Program for Elderly Persons With Osteoporosis and a Fall History: A Randomized Controlled Trial. *Arch Phys Med Rehabil* 91(11): 1705-11
188. Weerdesteyn V, Smulders E, Rijken H, et al. 2009. Preserved Effectiveness of a Falls Prevention Exercise Program After Implementation in Daily Clinical Practice. *J Am Geriatr Soc* 57(11): 2162-64
189. National Institute for Public Health and the Environment. Interventieoverzicht Valpreventie. Available from: <https://interventies.loketgezondleven.nl/interventieoverzicht2/Valpreventie> [Accessed 01/10/19]
190. Dutch Institute of Allied Health Care. Nijmegen Falls Prevention Program (Vallen Verleden Tijd). Available from: <https://www.npi.nl/cursussen-en-opleidingen/611-verdiepingscursus-vallen-verleden-tijd> [Accessed 30/09/19]
191. Fundacion Hispana de Osteoporosis y Enfermedades Metabolicas Oseas. 2018. *Tus Huesos Manana y Siempre*. Madrid: FHOEMO
192. Semana Internacional de Cine de Valladolid. Concha Velasco presents 'Mañana y Siempre', short film fighting osteoporosis. [Updated 23/10/18]. Available from: <https://www.seminci.es/en/concha-velasco-presents-manana-y-siempre-short-film-fighting-osteoporosis/> [Accessed 23/10/19]
193. La Vanguardia. Concha Velasco progagoniza un corto que sensibiliza sobre la osteoporosis. [Updated 31/07/18]. Available from: <https://www.lavanguardia.com/vida/20180731/451177680997/concha-velasco-protagoniza-un-corto-que-sensibiliza-sobre-la-osteoporosis.html> [Accessed 23/10/19]
194. Diaz F. Concha Velasco ayuda a prevenir la osteoporosis. [Updated 23/09/18]. Available from: https://www.diariodesevilla.es/gente/Concha-Velasco-osteoporosis_0_1284472095.html [Accessed 23/10/19]
195. Currie C, Partridge M, Plant F, et al. 2012. *The National Hip Fracture Database national report 2012*. London: The National Hip Fracture Database
196. Middleton M. 2018. Orthogeriatrics and Hip Fracture Care in the UK: Factors Driving Change to More Integrated Models of Care. *Geriatrics (Basel)* 3(3): 10.3390/geriatrics3030055
197. Metcalfe D, Zogg CK, Judge A, et al. 2019. Pay for performance and hip fracture outcomes: an interrupted time series and difference-in-differences analysis in England and Scotland. *Bone Joint J* 101-b(8): 1015-23
198. Royal College of Physicians. 2018. *National Hip Fracture Database annual report 2018*. London: RCP
199. Royal College of Physicians. 2018. *Fracture Liaison Service Database annual report: Achieving effective service delivery by fracture liaison services*. London: RCP
200. Royal College of Physicians. 2016. *Fracture Liaison Service Database (FLS-DB) facilities audit. FLS Breakpoint: opportunities for improving patient care following a fragility fracture*. London: RCP
201. Gallagher C, Vasilakis N, Javaid K. 2019. Fracture Liaison Services in England and Wales, inequity of access and quality of care after a fragility fracture. *Clin Med (Northfield Il)* 19(Suppl 2): 77
202. Healthcare Quality Improvement Partnership. 2017. *Fracture Liaison Service Database (FLS-DB) annual report. October 2017*. Camerton: National Osteoporosis Society
203. Sozen T, Ozisik L, Basaran NC. 2017. An overview and management of osteoporosis. *Eur J Rheumatol* 4(1): 46-56
204. Kanis JA. 2002. Diagnosis of osteoporosis and assessment of fracture risk. *The Lancet* 359(9321): 1929-36
205. Pisani P, Renna MD, Conversano F, et al. 2016. Major osteoporotic fragility fractures: Risk factor updates and societal impact. *World J Orthop* 7(3): 171-81
206. Pajulampi HM, Pihlajamäki HK, Luukkaala TH, et al. 2017. The Effect of an In-Hospital Comprehensive Geriatric Assessment on Short-Term Mortality During Orthogeriatric Hip Fracture Program-Which Patients Benefit the Most? *Geriatr Orthop Surg Rehabil* 8(4): 183-91
207. Schray D, Neuerburg C, Stein J, et al. 2016. Value of a coordinated management of osteoporosis via Fracture Liaison Service for the treatment of orthogeriatric patients. *Eur J Trauma Emerg Surg* 42(5): 559-64
208. McLellan AR, Gallacher SJ, Fraser M, et al. 2003. The fracture liaison service: success of a program for the evaluation and management of patients with osteoporotic fracture. *Osteoporos Int* 14(12): 1028-34
209. International Osteoporosis Foundation. FRAX version 3.6 released with five new country models. [Updated 05/05/12]. Available from: <https://www.iofbonehealth.org/frax%C2%AE-version-36-released-five-new-country-models> [Accessed 09/10/19]

Osteoporosis and fragility fracture prevention in Belgium



Osteoporosis and fragility fractures are not prioritised in national policies in Belgium. While local champions in some areas have implemented fragility fracture care pathways, national programmes to improve care have not been developed and services vary considerably across the country.

Burden and impact of osteoporosis and fragility fractures

Osteoporosis affects a large proportion of older people in Belgium, and fragility fractures impose a considerable cost. According to the most recent estimates in 2007, 600,000 people in Belgium had osteoporosis, representing 22.4% of women and 6.6% of men over 50.¹ In 2010, it was estimated that fragility fractures incurred a total cost of €606 million each year in Belgium, with 80,000 new fragility fractures occurring annually.¹ The total number of fragility fractures was expected to increase to 99,000 by 2025, reaching a total cost of €733 million.¹

Building a system that works: policies for scrutiny, accountability and investment

Osteoporosis and fragility fractures do not appear to be prioritised in national policy and relevant data are not collected.² While national guidance for managing osteoporosis has been developed,^{3,4} there are no policies to ensure clinical practice follows this guidance.² Reimbursement data have sometimes been analysed to assess the use of specific services such as dual-energy X-ray absorptiometry (DXA) scans,⁵ but there are no national audits or databases to monitor and evaluate osteoporosis or fragility fracture care.²

Recent changes in reimbursement policy have improved access to some first-line treatments for osteoporosis. Reimbursement of all osteoporosis medications was previously restricted to people who met specific eligibility criteria, such as those diagnosed with osteoporosis or who had a previous fracture.^{3,4} This resulted in severely limited access to these medications.⁶ However, an expert interviewed for this country profile noted that recent revisions to reimbursement policy mean there are no longer specific criteria for reimbursement of some first-line treatments, although the criteria have become more stringent for second-line treatments.² While co-payments are required for prescription medications in Belgium,⁷ out-of-pocket expenses for osteoporosis medication are generally thought to be low² and vulnerable groups are entitled to additional financial support,⁷ aiding access to necessary treatments.

Despite a large number of DXA machines in Belgium, restricted reimbursement may impede early identification of osteoporosis.² Belgium has the highest proportion of DXA machines per capita in Europe,⁶ which makes them widely available with, in general, short waiting times.² However, DXA scans are only reimbursed for specific people, such as women over 65 who have a family history of osteoporosis, people who have already had a fragility fracture, or people with another condition known to cause osteoporosis.³ This means that many people lack access to investigation before a first fracture occurs.

Catching it early: detection and management in primary care

Assessment of fracture risk is recommended in established guidance,³ but diagnosing osteoporosis is often not prioritised. Primary care organisations in both the French- and Dutch-speaking parts of Belgium are engaged with falls and fracture prevention and have developed relevant guidelines.^{8,9} Clinical recommendations support the use of risk assessment algorithms such as the Fracture Risk Assessment Tool (FRAX[®]) before conducting further investigations or prescribing treatment.³ However, there do not seem to be programmes in place to encourage early detection of osteoporosis, and general practitioners (GPs) may lack confidence in diagnosing and treating it.² A survey conducted in 2013 found that around a third of GPs were aware of FRAX[®] but fewer than 20% reported using it in daily practice.¹⁰ In the absence of national programmes to promote early diagnosis of osteoporosis, there is little incentive for primary care professionals to initiate investigation.

Getting people back on track: facilitating multidisciplinary post-fracture care

Geriatric care is integrated into the in-hospital treatment of older people in Belgium, although the management of fragility fractures can vary. The national geriatric programme includes the implementation of 'internal liaison teams'.¹¹ In some hospitals, these specialist teams are available to assess all patients aged 75 and over who have been admitted to hospital, regardless of the department to which they have been admitted, and identify those who require specialist geriatric care. In other hospitals, multidisciplinary teams are engaged in the identification and treatment of osteoporosis and fragility fractures.² While there are no national programmes or standards for

fragility fracture care, in a few hospitals these teams aid the identification of older people who should be assessed for osteoporosis and who require orthogeriatric management.² In addition, some hospitals have established dedicated orthogeriatric units, such as the one in Imelda Hospital in Bonheiden,² or osteoporotic fracture care pathways, such as the pharmacist-led pathway in AZ Sint-Jan hospital.¹² However, such programmes are often not formally monitored or evaluated and financial support is extremely limited, resulting in reports of considerable variation in care between hospitals.²

Case study

Pharmacist-led clinical pathway, Belgium

Implementation of hospital-based fracture liaison services (FLS) in Belgium is increasing, but with little policy support.² In the absence of national guidelines or programmes to support fragility fracture services, there is marked variation in care. For example, the use of DXA scans varies hugely, with some districts conducting nearly 10 times as many scans as others each year.⁵ To improve quality of care, clinicians from a range of specialties have worked to implement FLS in some hospitals, which ensure identification, investigation and initiation of treatment for people with osteoporosis.² However, limited funding has been noted as a considerable challenge² and it is not clear how these services perform against international best-practice standards. Indeed, there does not seem to be a national monitoring or evaluation system in place,² and only four FLS in the country have been evaluated through Capture the Fracture[®]; three have been awarded a bronze rating and one is in progress.¹²

Supporting quality of life as part of healthy and active ageing: prevention of falls and fractures in later life

While falls prevention has received little attention at national level, there is some regional support in Flanders. The number of falls in care homes is one of various indicators used by the national government to assess healthcare system performance, but data for this indicator are only available for Flanders,¹⁴ as Brussels and Wallonia do not collect data on falls. To support and promote falls prevention, the Flemish government collaborates with the Flanders Fall and Fracture Prevention Expertise Centre (Expertisecentrum Val- en fractuurpreventie Vlaanderen; EVV). This organisation aims to prevent falls in both care homes and the community through providing information and supporting the development and dissemination of effective strategies.¹⁵ For example, EVV runs annual awareness campaigns, produces educational materials and offers training courses for healthcare providers and informal carers.¹⁶

Engaging patients and public: awareness, activation and self-management

Public engagement with osteoporosis and fragility fracture prevention seems to be limited,² with few activities to increase awareness. An expert interviewed for this country profile noted that, in Belgium, neither healthcare providers nor the public tend to view osteoporosis as an important disease,² although GP organisations have developed guidelines and online resources to support falls and fracture prevention.^{8,9} While there used to be a national osteoporosis patient organisation, this no longer seems to be active.² A national multidisciplinary organisation, the Belgian Bone Club, is working to improve osteoporosis prevention and management, but its activities target healthcare professionals and researchers while public-facing activities remain limited.¹⁷ Furthermore, while many countries across Europe and around the world participate in World Osteoporosis Day, there are no official events planned in Belgium.¹⁸

Self-management among people who have osteoporosis is suboptimal. Data from 2003–2008 showed that people frequently stopped taking osteoporosis medication within the first three months after it was prescribed.³ Unfortunately, more recent data are not available.



There is great variation in care; it is really a lottery. It depends on the individual hospital or the individual GP.

**MICHAËL LAURENT,
BELGIAN BONE CLUB**



References

1. Svedbom A, Hernlund E, Ivergard M, *et al.* 2013. Osteoporosis in the European Union: a compendium of country-specific reports. *Arch Osteoporos* 8: 137
2. Laurent M. 2019. Interview with Taylor Morris at The Health Policy Partnership [telephone]. 03/10/19
3. Belgian Health Care Knowledge Centre. 2011. *Prévention médicamenteuse des fractures ostéoporotiques*. Brussels: KCE
4. Body JJ, Bergmann P, Boonen S, *et al.* 2010. Evidence-based guidelines for the pharmacological treatment of postmenopausal osteoporosis: a consensus document by the Belgian Bone Club. *Osteoporos Int* 21(10): 1657-80
5. Meeus P, Dalcq V, Geystelen AV. 2019. *Medical practice variations: bone densitometry (50 years and older)*. Brussels: Directorate for Research Development and Quality promotion: Appropriate care unit
6. Kanis JA, Borgstrom F, Compston J, *et al.* 2013. SCOPE: a scorecard for osteoporosis in Europe. *Arch Osteoporos* 8: 144
7. Vogler S, Haasis MA, Dedet G, *et al.* 2018. *Medicines reimbursement policies in Europe*. Copenhagen: World Health Organization
8. Société Scientifique de Médecine Générale. 2008. *Recommandations de bonne pratique: Prévention des chutes chez les personnes âgées*. Brussels: SSMG
9. Domus Medica. 2015. *Praktijkinstrumenten val- en fractuurpreventie*. Antwerp: Domus Medica
10. Bruyere O, Nicolet D, Compere S, *et al.* 2013. Perception, knowledge, and use by general practitioners of Belgium of a new WHO tool (FRAX) to assess the 10-year probability of fracture. *Rheumatol Int* 33(4): 979-83
11. Baeyens J. 2010. Belgian care programme for older patients. *J Nutr Health Aging* 14(6): 474-75
12. Saey S, Piette Y, Verstraete B, *et al.* 2018. Building for better bones: evaluation of a clinical pathway in the secondary prevention of osteoporotic fractures. *Eur J Hosp Pharm* 25(4): 210-13
13. International Osteoporosis Foundation. Map of Best Practice. Available from: <https://www.capturethefracture.org/map-of-best-practice> [Accessed 18/11/19]
14. For a Healthy Belgium. Care for the elderly. [Updated 25/04/19]. Available from: <https://www.healthybelgium.be/en/health-system-performance-assessment/specific-domains/care-for-the-elderly#ELD-7> [Accessed 04/10/19]
15. Expertiscenetrum Valpreventie Vlaanderen. Het Expertisecentrum. Available from: <https://www.valpreventie.be> [Accessed 04/10/19]
16. Expertiscenetrum Val- en fractuurpreventie Vlaanderen. Aanbod. Available from: <https://www.valpreventie.be/aanbod> [Accessed 04/10/19]
17. Belgian Bone Club. The Belgian Bone Club. Available from: <http://www.bbcbonehealth.org/> [Accessed 08/10/19]
18. International Osteoporosis Foundation. World Osteoporosis Day. Available from: <http://www.worldosteoporosisday.org/> [Accessed 07/08/19]

Osteoporosis and fragility fracture prevention in Finland



National guidance in Finland supports identification and management of osteoporosis and fragility fractures, with many people being diagnosed before a first fracture. While few national strategies have been implemented to prevent osteoporosis, falls prevention is a policy priority, lending support to a range of falls and fracture prevention programmes.

Burden and impact of osteoporosis and fragility fractures

The burden of osteoporosis in Finland is comparable to other countries in Europe.

When last assessed in 2010, it was estimated that 304,453 people aged 50 or over in Finland had osteoporosis, representing 21.5% of women and 6.3% of men in this age group.¹ It is estimated that between 30,000 and 40,000 fractures occur in Finland every year,² of which over 6,000 are hip fractures.³ In total, osteoporosis cost the Finnish health system an estimated €383 million per year, a figure that is set to rise to €514 million by 2025.¹

Building a system that works: policies for scrutiny, accountability and investment

Healthcare policies in Finland aim to improve health services and support independence in older age, but do not specifically address osteoporosis or fragility fractures. National legislation, such as the Health Care Act⁴ and the Act on Supporting the Functional Capacity of the Older Population and on Health Care Services of Older Persons,⁵ specify how health and social care should be operated and monitored in order to promote population health and ensure older people have access to all necessary services. However, specific diseases are generally not addressed in national policies and there seems to be a lack of strategies that discuss osteoporosis or fragility fractures.⁶

Data on hip fracture treatment are collected in a national healthcare database, but no dedicated programmes are in place for monitoring or evaluating fracture care.⁶ National data on inpatient care are collected in the Care Register for Health Care and can be used for research and monitoring purposes.⁷ Hospitals, health centres and other institutions enter the details on each patient's condition and the treatment received,⁷ so data on treatment of hip fractures and associated medication usage can be accessed.⁶ However, there are no questions that are specific to osteoporosis or fracture management,⁷ nor is there a dedicated fracture database or national audit.⁶



Management of a fracture depends on the area where a person lives and how the national guidelines have been put into practice.

PAULIINA TAMMINEN, FINNISH OSTEOPOROSIS ASSOCIATION

While all people in Finland are covered by the social health insurance system, limited reimbursement means some people cannot access osteoporosis care.

As part of the national healthcare system, medications and services are partially reimbursed, but co-payments must be made by the individual or through private health insurance.⁸ For the most disadvantaged people, co-payments are a barrier to care; a survey of Finnish Osteoporosis Association (Suomen Luustoliitto) members found that 6.5% of people with osteoporosis felt they could not afford, or usually could not afford, their osteoporosis treatment.^{9 10} For these people, social assistance may be available to help pay for medical expenses.¹¹

Catching it early: detection and management in primary care

Clinical guidance in Finland promotes diagnosis and treatment of osteoporosis in primary care and this often happens before a first fracture. Primary care professionals are often responsible for investigating osteoporosis and initiating treatment.² This is supported by extensive clinical guidance, which discusses risk factors for osteoporosis and the various treatment options available.² While around a third of people are diagnosed with osteoporosis after they have already had a fracture, a survey of osteoporosis patients found that 20% were diagnosed when they were seeing their primary care doctor about another illness and another 16% were diagnosed when they specifically asked their doctor about it.^{9 10} This suggests that many primary care providers are aware of key risk factors and assess patients for osteoporosis in line with clinical guidance.

Getting people back on track: facilitating multidisciplinary post-fracture care

Multidisciplinary in-hospital management of fragility fractures is recommended in clinical guidance, but there are no national programmes to promote best-practice care. Detailed clinical guidance in Finland describes best practice in hip fracture care with a focus on multidisciplinary management and rehabilitation.³ To meet these recommendations, some hospitals have implemented hip fracture programmes in which

dedicated care pathways are used to ensure patients are seen by multiple specialists, including geriatricians.¹² In one hospital where a multidisciplinary hip fracture programme was implemented, the rate of deaths within 30 days of fracture was lower among people who received a comprehensive geriatric assessment.¹² However, implementation of such programmes does not seem to be incentivised or monitored nationally, and care pathways differ between hospitals.⁹

Effective nurse-led post-fracture services which include diagnosis and treatment for osteoporosis are in place in some areas, but there remain gaps in access.⁹ In many organisations, including primary care practices, health centres and hospitals, designated osteoporosis nurses review fractures and identify patients who should be followed-up and treated.^{6 9} These nurse-led models of care are thought to be effective⁶ and are recommended in national guidance,² but have not yet been universally adopted.⁹ This may be due, in part, to varying health and social care priorities at a local level.⁹

Supporting quality of life as part of healthy and active ageing: prevention of falls and fractures in later life

Falls prevention is recognised as a national health priority in Finland as falls-related deaths continue to increase. Among Finland's rapidly ageing population, falls are a serious concern, with around 1,200 people dying from accidental falls in 2017.¹³ In response, the prevention of falls has been identified as a national public health priority¹⁴ and interventions are being implemented at local and national level.¹⁵ For example, a falls prevention network which encourages collaboration across municipalities and provinces is currently being developed with funding from the Ministry of Social Affairs and Health.¹⁶ In addition, falls prevention is an integral component of national osteoporosis and hip fracture prevention guidance.^{2 3} Despite these initiatives, national statistics have not yet shown a decline in falls-related deaths among older people.¹³

Engaging patients and public: awareness, activation and self-management

Civil society is active in educating the public about osteoporosis and the risk of fragility fractures. The Finnish Osteoporosis Association offers a range of free training courses which support professionals to promote awareness and self-management among people with osteoporosis, including educating the public on how to prevent falls.^{9 17} In addition, it provides peer support, rehabilitation and educational materials for people with osteoporosis.⁹ Similarly, the Finnish Osteoporosis Society offers a range of educational resources for people with osteoporosis, such as public lectures, a booklet on self-management¹⁸ and an annual two-day course on osteoporosis.¹⁹

Good awareness of osteoporosis and key risk factors helps to support early diagnosis in Finland. Public awareness of osteoporosis seems to have improved over time,^{6 20} leading people to ask their doctor about being tested for osteoporosis before experiencing a first fracture.⁹ A recent survey of people with osteoporosis found that 20% were diagnosed this way.^{9 10} Specifically, 15% knew about the risks and were worried about their bone health, 3% noticed they were getting shorter and 2% were advised by somebody with osteoporosis to get screened.^{9 10}



In the last 30 years, I have seen great improvement in the recognition of osteoporosis and fractures in the population.

TIMO JÄMSÄ, UNIVERSITY OF OULU



Osteoporosis course, Finland

References

1. Svedbom A, Hernlund E, Ivergard M, *et al.* 2013. Osteoporosis in the European Union: a compendium of country-specific reports. *Arch Osteoporos* 8: 137
2. Duodecim. 2018. *Osteoporoosi*. Helsinki: Duodecim
3. Duodecim. 2017. *Lonkkamurtuma*. Helsinki: Duodecim
4. Health Care Act. 2010. Finland: 30/12/10
5. Act on supporting the functional capacity of the older population and on social and health care services for older persons. 2012. Finland: 28/12/12
6. Simonen O. 2019. Interview with Taylor Morris at The Health Policy Partnership [telephone]. 25/09/19
7. Finnish Institute for Health and Welfare. Care register for health care. [Updated 26/02/16]. Available from: <https://thl.fi/en/web/thlfi-en/statistics/information-on-statistics/register-descriptions/care-register-for-health-care#data> [Accessed 26/09/19]
8. Kela. Reimbursements for medicine expenses. [Updated 01/01/19]. Available from: <https://www.kela.fi/web/en/medicine-expenses> [Accessed 01/10/19]
9. Holm A, Tamminen P. 2019. Interview with Taylor Morris at The Health Policy Partnership [telephone]. 30/09/19
10. Holm A. 2019. *Osteoporoosin hyvä hoito: Luustoliiton kyselyn tuloksia 2019*. Helsinki: Luustoliitto
11. Kela. Types of expenses for which you can get basic social assistance. [Updated 28/11/16]. Available from: <https://www.kela.fi/web/en/social-assistance-types-of-expenses-for-which-you-can-get> [Accessed 03/12/19]
12. Pajulammi HM, Pihlajamäki HK, Luukkaala TH, *et al.* 2017. The Effect of an In-Hospital Comprehensive Geriatric Assessment on Short-Term Mortality During Orthogeriatric Hip Fracture Program-Which Patients Benefit the Most? *Geriatr Orthop Surg Rehabil* 8(4): 183-91
13. Official Statistics of Finland. 2018. *Causes of death*. Helsinki: OSF
14. Ministry of Social Affairs and Health. 2014. *Target programme for the prevention of home and leisure accident injuries 2014-2020*. Helsinki: Ministry of Social Affairs and Health
15. Finnish institute for health and welfare. Injury prevention: older people. [Updated 20/08/18]. Available from: <https://thl.fi/en/web/injury-prevention/accidental-injuries/older-people> [Accessed 01/10/19]
16. UKK instituutti. läkkäiden kaatumisten ehkäisy. [Updated 29/08/19]. Available from: <https://www.ukkinstituutti.fi/kaatumisseula> [Accessed 01/10/19]
17. Luustoliitto. Koulutukset ammattilaisille. Available from: <https://luustoliitto.fi/ammattilaisille/koulutukset/ammattilaisille/> [Accessed 01/10/19]
18. Suomen Osteoporoosiyhdistys. *Luustoterveyttä murkusta mummoon*. Helsinki: Suomen Osteoporoosiyhdistys
19. Simonen O. 2019. Personal communication by email: 25/11/19
20. Jämsä T. 2019. Interview with Taylor Morris at The Health Policy Partnership [telephone]. 21/08/19

Osteoporosis and fragility fracture prevention in France



Osteoporosis and the prevention of fragility fractures and falls are beginning to be prioritised in health policy in France. Awareness and understanding of osteoporosis among healthcare professionals and patients is often poor, however, leading to delays in diagnosis and significant gaps in treatment.

Burden and impact of osteoporosis and fragility fractures

Osteoporosis and fragility fractures are common in France, imposing considerable costs. Osteoporosis affects approximately 23% of women and 7% of men in France,¹ and 380,000 new fragility fractures occur each year.¹ In 2017, fragility-fracture-related costs were estimated at €5.4 billion in France.¹ In addition, over a million sick days were taken following a fragility fracture in 2017, negatively impacting on workforce productivity.¹

The burden of osteoporosis will continue to grow as the population ages. In France, as in other European countries, life expectancy is increasing and so is the burden of osteoporosis.² The number of people hospitalised in France for a fracture related to osteoporosis increased by approximately 10% between 2011 and 2013.² The number of fragility fractures will continue to increase and the associated care costs are projected to reach €6.8 billion by 2030.¹

Building a system that works: policies for scrutiny, accountability and investment

Osteoporosis management and prevention of subsequent fractures are beginning to feature in national strategies. In 2017, the French anti-rheumatism association (L'Association Française de Lutte Anti-Rhumatismale; AFLAR) and the National Alliance Against Osteoporosis published a White Paper calling for urgent action on the part of health authorities.² In 2018, the Ministry of Solidarity and Health published a new strategy, My Health 2022 (Ma Santé 2022), to improve access to care and support collaborative working between health professionals.³ Improving long-term care for people with osteoporosis is named as a priority objective in this strategy.³ While the strategy does not specify how osteoporosis care should be improved, guidance is currently under development, and may include support for implementing new fracture liaison services (FLS).⁴

Healthy ageing and falls prevention are also integrated into national prevention policy.

The National Health Strategy for 2018–2022 aims to improve healthcare nationwide through preventive health measures and improving care quality. The strategy refers to nutrition, exercise and falls prevention as key priorities to tackle chronic diseases, as well as the importance of disseminating messages on ‘ageing well’ and identifying fragility risk in older people.⁵

France collects data on osteoporosis via the comprehensive National Health Data System (Système National des Données de Santé), which is available on request to people conducting research of public interest.^{6,7} For example, trends in use of osteoporosis medication can be assessed to investigate the impact of new programmes.⁴ Many individual hospitals also collect data on fragility fractures;⁷ however, there are no open-access databases and national audits on osteoporosis.⁷

Reimbursement policies for bone mineral density (BMD) testing are in place, but their complex nature may be contributing to underutilisation.⁴ Since 2006, French national health insurance covers BMD testing for people who have sustained a fragility fracture, regardless of age or sex, as well as for people with certain risk factors.^{8,9} However, some general practitioners (GPs) are still unclear about which people are covered under the reimbursement policies, leading to reduced rates of BMD testing in France.^{2,7,10,11}

The health system supports good access to osteoporosis treatments in France.^{7,9} Many treatments are reimbursed for all patients following a fracture and for those at risk of fracture (depending on BMD).^{7,9}

Catching it early: detection and management in primary care

Many primary care professionals lack the knowledge to effectively identify people with osteoporosis.^{12,13} Studies have revealed that GPs in France may underestimate the associated risks² and may not initially consider a diagnosis of osteoporosis.^{11,13} A 2017 survey found that 66% of GPs felt they needed to be better informed about osteoporosis.² It has been noted that complexities in national guidance may act as a barrier to appropriate management of osteoporosis in primary care.⁴ In addition, GPs may be uncertain about interpreting results from diagnostic tests.¹⁴

This has contributed to a decrease in the number of people being assessed for osteoporosis. France has good provision of dual-energy X-ray absorptiometry machines in comparison with other European countries¹⁰ as well as a country-specific Fracture Risk Assessment Tool (FRAX®).^{10,11,15} However, the number of BMD assessments has not increased with the rising population at risk of osteoporosis.^{2,8} In fact, there has been a decrease in BMD assessments each year of approximately 6%.²

Gaps in knowledge among GPs have also contributed to alarmingly low treatment rates for women with osteoporosis in France.^{1,12,13,16} Research shows that only 15% of women over the age of 50 receive treatment after an initial fragility fracture,¹ and some GPs prescribe only vitamin D and calcium as treatments for osteoporosis.⁷ Reasons are varied and may include poor awareness of evidence-based clinical guidelines, difficulties in understanding the benefit–risk ratio of various treatments, and time restrictions during consultations.⁷

Getting people back on track: facilitating multidisciplinary post-discharge care

Lack of standardised care pathways and multidisciplinary working in France leave many people at risk of rehospitalisation following a fragility fracture.^{7,17} National osteoporosis guidelines recommend a comprehensive approach to fracture and falls prevention with individualised assessment of risk factors and the provision of appropriate multidisciplinary care.⁹ However, limited multidisciplinary collaboration for fracture care has been noted as a considerable challenge to implementation of FLS in France.⁴ An estimated 15–30 FLS are in operation in France,¹⁷ and only 10–25% of hospitals report having a fracture referral system.¹ However, there are some examples of effective FLS, including the service at Lille University Hospital.¹⁸ It is estimated that the introduction of FLS for all people aged over 50 years could prevent 2,665 fragility fractures in France every year.¹

Efforts to improve the post-discharge care pathway for patients with a fragility fracture are underway, but are yet to show positive outcomes. A hospital discharge programme that launched in 2010, Programmes d’accompagnement du retour à domicile après hospitalisation (PRADO), aims to provide better follow-up for patients in the community following hospitalisation.¹⁹ As part of the service, a national health insurance advisor liaises with the multidisciplinary team to coordinate discharge from hospital.¹⁹ While PRADO has been effective for some conditions, patients with fragility fractures have not benefited as much; this may be at least partly due to limited coordination between hospital staff and the national health insurance advisors.⁷



One of the problems in our health system is the lack of collaboration between general practitioners, specialists and pharmacists.



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Fracture liaison service at Lille University Hospital, France



People in France have difficulties in understanding the risk of osteoporosis and the disability associated with fragility fractures. Many people still believe that having a fracture when they fall is normal.

THIERRY THOMAS, UNIVERSITY HOSPITAL ST ETIENNE



Supporting quality of life as part of healthy and active ageing: prevention of falls and fractures in later life

Falls prevention programmes have been initiated at local or regional levels in France, with some evidence of impact. For example, the multidisciplinary Montpellier falls prevention clinic has been shown to reduce the number of falls and fear of falling, and improve mobility among older patients.²⁰ Further research is needed to demonstrate the impact of falls prevention programmes on a larger scale.

Engaging patients and public: awareness, activation and self-management

Low awareness of osteoporosis and misunderstandings in the population contribute to low levels of treatment.

People with osteoporosis lack understanding of their condition, are often wary of treatments and are concerned about side effects due to negative publicity on social media and in the press.^{7 14 21 22} Similarly, as noted above, some GPs may not adequately prioritise the management of osteoporosis.²¹ As a result, a large proportion of people do not take the medication they need to prevent fractures.^{21 23}

While public awareness campaigns exist in France, their impact is unclear. AFLAR runs a number of public awareness campaigns on osteoporosis, including the launch in 2014 of a ‘Bone Thief’ mobile application aimed at the general public and physicians,²⁴ and a 2018 national awareness campaign for World Osteoporosis Day.²⁵ Public understanding of osteoporosis remains low, however, and there is a need for further evidence-based public awareness programmes which highlight the benefits of osteoporosis prevention and treatment.^{4 14 21}

References

1. International Osteoporosis Foundation. 2018. *Broken bones, broken lives: A roadmap to solve the fragility fracture crisis in France*. Nyon: IOF
2. Association Française de Lutte Antirhumatismale (AFLAR), Alliance Nationale Contre L'Osteoporose. 2017. *'Livre Blanc - États Généraux De L'ostéoporose - Pour un plan de santé publique contre les fractures liées à l'ostéoporose'*. Paris: AFLAR
3. Ministère des Solidarités et de la Santé. Ma santé 2022 : un engagement collectif. Available from: <https://solidarites-sante.gouv.fr/systeme-de-sante-et-medico-social/masante2022/> [Accessed 04/11/19]
4. Poirvet D. 2019. Interview with Taylor Morris at The Health Policy Partnership [telephone]. 01/11/19
5. République Française Ministère des Solidarités et de la Santé. 2017. *Stratégie nationale de santé 2018-2022*. Paris: Ministère des Solidarités et de la Santé
6. National Fund for Employee Workers' Health Insurance (CNAMTS). Système National des Données de Santé (SNDS). Available from: <https://www.snds.gouv.fr/SNDS/Accueil> [Accessed 20/09/19]
7. Thomas T. 2019. Interview with Taylor Morris and Emily Kell at The Health Policy Partnership [telephone]. 20/09/19
8. Canoui-Poitrine F, Jaglal S, Chapurlat R, et al. 2010. Has reimbursement of bone mineral density testing and anti-osteoporotic treatments improved management of osteoporosis in France? *Bone* 47(4): 790-4
9. Briot K, Roux C, Thomas T, et al. 2018. 2018 update of French recommendations on the management of postmenopausal osteoporosis. *Joint Bone Spine* 85(5): 519-30
10. Kanis JA, Borgstrom F, Compston J, et al. 2013. SCOPE: a scorecard for osteoporosis in Europe. *Arch Osteoporos* 8: 144
11. Lespessailles É, Cotté F-E, Roux C, et al. 2009. Prevalence and features of osteoporosis in the French general population: The Instant study. *Joint Bone Spine* 76(4): 394-400
12. Flais J, Coiffier G, Le Noach J, et al. 2017. Low prevalence of osteoporosis treatment in patients with recurrent major osteoporotic fracture. *Arch Osteoporos* 12(1): 24
13. Erny F, Auvinet A, Chu Miow Lin D, et al. 2015. Management of osteoporosis in women after forearm fracture: Data from a French health insurance database. *Joint Bone Spine* 82(1): 52-55
14. Merle B, Haesebaert J, Bedouet A, et al. 2019. Osteoporosis prevention: Where are the barriers to improvement in French general practitioners? A qualitative study. *PLoS One* 14(7): e0219681
15. Kanis JA, Cooper C, Rizzoli R, et al. 2019. European guidance for the diagnosis and management of osteoporosis in postmenopausal women. *Osteoporos Int* 30(1): 3-44
16. Viprey M, Caillet P, Canat G, et al. 2015. Low Osteoporosis Treatment Initiation Rate in Women after Distal Forearm or Proximal Humerus Fracture: A Healthcare Database Nested Cohort Study. *PLoS One* 10(12): e0143842
17. Teixeira A, Trinquart L, Raphael M, et al. 2009. Outcomes in older patients after surgical treatment for hip fracture: a new approach to characterise the link between readmissions and the surgical stay. *Age Ageing* 38(5): 584-89
18. Pflimlin A, Gournay A, Delabrière I, et al. 2019. Secondary prevention of osteoporotic fractures: evaluation of the Lille University Hospital's Fracture Liaison Service between January 2016 and January 2018. *Osteoporos Int* 30(9): 1779-88
19. International Osteoporosis Foundation. 2019. France's first national service to provide post-hospitalisation follow up care for fragility fracture patients. Available from: <https://www.capturethefracture.org/france%E2%80%99s-first-national-service-provide-post-hospitalization-follow-care-fragility-fracture-patients> [Accessed 21/11/19]
20. Blain H, Dabas F, Mekhinini S, et al. 2019. Effectiveness of a programme delivered in a falls clinic in preventing serious injuries in high-risk older adults: A pre- and post-intervention study. *Maturitas* 122: 80-86
21. Alami S, Hervouet L, Poiraudreau S, et al. 2016. Barriers to Effective Postmenopausal Osteoporosis Treatment: A Qualitative Study of Patients' and Practitioners' Views. *PLoS One* 11(6): e0158365
22. Boudou L, Gerbay B, Chopin F, et al. 2011. Management of osteoporosis in fracture liaison service associated with long-term adherence to treatment. *Osteoporos Int* 22(7): 2099-106
23. Belhassen M, Confavreux CB, Cortet B, et al. 2017. Anti-osteoporotic treatments in France: initiation, persistence and switches over 6 years of follow-up. *Osteoporos Int* 28(3): 853-62
24. AFLAR. 2019. Labellisation “Le Voleur d’Os” - Medappcare Application “Le Voleur d’Os”. Available from: <http://www.aflar.org/le-voleur-d-os> [Accessed 11/09/19]
25. AFLAR. 2019. Ostéoporose : La presse en parle! Available from: <http://www.aflar.org/osteoporose-la-presse-en-parle-488> [Accessed 11/09/19]

Osteoporosis and fragility fracture prevention in Germany



There are several barriers to improving prevention of osteoporosis and fragility fractures in Germany, including restricted reimbursement and a lack of national data. While multidisciplinary care is well-integrated into the treatment of fragility fractures, both fracture prevention and post-fracture follow-up are limited.

Burden and impact of osteoporosis and fragility fractures

Germany has among the highest number of fragility fractures of any population in Europe.^{1,2} Osteoporosis affects around 23% of women and nearly 7% of men over the age of 50 in Germany,³ levels which are comparable to other European countries. Due to its large population size, Germany has the highest number of fragility fractures per year of all EU5 countries; in 2017 alone, there were 765,000 fragility fractures. Alarming, this is predicted to increase to over 900,000 by 2030.³

The cost of care and treatment for fragility fracture patients in Germany is significant and is predicted to increase substantially over the coming years. Healthcare costs for German women over the age of 50 who have osteoporosis – and are thus likely to sustain a fragility fracture – are more than three times the cost of care for those without osteoporosis.⁴ These costs present a considerable financial burden. Fragility-fracture-related costs amounted to over €11 billion in 2017, and are expected to rise to nearly €14 billion by 2030.³ This is largely driven by the costs associated with inpatient treatment and long-term care for those who have experienced a fragility fracture.⁴

Building a system that works: policies for scrutiny, accountability and investment

The urgency of osteoporosis and fragility fractures does not appear to be recognised in health policy. It receives little attention in comparison to other chronic diseases such as diabetes, which seems to contribute to a lack of reimbursement and funding of care models for fragility fracture prevention.^{1,5,6} While a law for prevention (Präventionsgesetz) passed in 2015 – widely considered an important step towards a greater focus on prevention in Germany – it has been noted that this law has a narrow focus and does not encompass secondary or tertiary prevention, and neither osteoporosis nor bone health are included.⁷

Germany has some registries collecting information on different types of fracture^{8,9} but data entry is voluntary, which may jeopardise comprehensiveness.^{5,10} Fracture Registries are mainly run by the German Society for Orthopaedics and Trauma (Deutsche Gesellschaft für Orthopädie und Unfallchirurgie; DGOU), the German Geriatric Society (Deutsche Gesellschaft für Geriatrie) and the German Osteology Society (Dachverband Osteologie; DVO).^{5,8-10} However, there is currently no registry combining data on all types of fractures, and data on quality of fracture care and outcomes are often not collected, analysed or used systematically.^{5,10} To address this, there have been efforts to establish a patient-centred fracture registry collecting data based on results of patient questionnaires, which has been shown to be feasible.¹¹

There are significant financial barriers to providing comprehensive fragility fracture prevention and care.^{1,5,6,12} Experts interviewed for this country profile noted that healthcare professionals are, for example, often only marginally compensated for fragility fracture prevention, if at all.^{5,6} As part of a pilot project which aims to reduce overall fragility fracture costs, some health insurance providers have increased payments to healthcare professionals for the delivery of osteoporosis-related services.¹³ It has been noted, however, that there seem to be no efforts to improve reimbursement structures for fragility fracture care across the country in the long term.⁶

Catching it early: detection and management in primary care

People at high risk of sustaining a fragility fracture are often not identified or adequately managed in routine care in Germany.^{1,12,14-18} Routine investigation of fracture risk and osteoporosis in people with known risk factors is not well-established.^{12,17} Management of people with an existing fracture appears equally deficient, with primary care professionals rarely following the specialists' treatment recommendation after a fracture.^{5,6,15} Gaps in knowledge among primary care professionals,¹⁹ an absence of referral systems³ and a lack of adequate compensation for investigating fracture risk contribute to the gap in diagnosis and management.^{5,6,13} For example, while the tariff paid to healthcare professionals for performing a dual-energy X-ray absorptiometry (DXA) scan has recently been raised, it still fails to fully cover costs.²⁰ It has further been noted



Policymakers need to prioritise adequate reimbursement and incentives to deliver best-practice care for osteoporosis and fragility fractures – this is the key lever to change clinical practice.



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THE BONE AND JOINT DECADE
(G-MUSC)**



We have preventive check-ups for breast cancer, diabetes and many other conditions. The same could be easily introduced for osteoporosis, for example as a simple, low-cost risk assessment offered to women over the age of 65.

ANDREAS KURTH, GERMAN OSTEOLOGY SOCIETY



that many people may not fulfil the strict criteria for referral, meaning they will need to pay for a scan out-of-pocket if they wish to investigate their fracture risk.²⁰

Efforts to improve the management of osteoporosis in primary care through greater multidisciplinary collaboration are underway. Successful past initiatives^{6,21} often failed to maintain long-term impact which may be due, at least in part, to a lack of sustainable funding. The planned introduction of a disease management programme, which has already improved care for other chronic diseases, could foster greater collaboration between specialists and primary care, and create incentives for delivering best-practice care.^{22,23} Furthermore, the DVO is certifying doctors in primary care to become osteologists, to increase their qualification to treat people with osteoporosis.²⁴

Getting people back on track: facilitating multidisciplinary post-discharge care

Germany performs well in providing hospital-based multidisciplinary care for patients after a fracture, but often fails to initiate measures to prevent subsequent fractures.¹² Orthogeriatric care is widely recognised as an integral component of in-hospital care for older people who have sustained a fragility fracture, and has improved acute care post-fracture.^{14, 25-28} However, a recent study from one area in Germany suggested doctors in orthopaedic and trauma departments are failing to diagnose osteoporosis following a fracture in as many as 70% of fracture patients.¹⁷ Germany is falling behind many other European countries such as France, Italy, Spain and the UK, where up to 80% of fracture patients are adequately treated for their underlying risk factors.²⁴

There is currently no standardised pathway to ensure adequate post-discharge care and seamless transition to primary care, presenting a missed opportunity to reduce fracture risk in the long term.^{12,24} Only a minority of hospitals have a referral pathway in place for patients post-fracture, meaning the majority of people are discharged without clear treatment recommendations.^{3,17} This results in suboptimal management following discharge.²⁹⁻³¹ Data from 2015 revealed that more than 90% of people did not receive any treatment for osteoporosis within 12 months of their first fracture.²⁴

Efforts are underway to pilot models for improving multidisciplinary post-discharge care in Germany.

To bridge the treatment gap following a fracture, two fracture liaison services (FLS) have recently been established,³² successfully improving outcomes by linking patients to registered physicians such as endocrinologists, geriatricians and general practitioners.^{24,33} The use of FLS at a German trauma centre led to more people being diagnosed with osteoporosis and 90% being prescribed a treatment to reduce their fracture risk.¹⁸

Supporting quality of life as part of healthy and active ageing: prevention of falls and fractures in later life

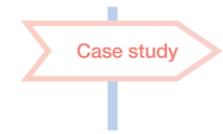
Germany has been spearheading research and initiatives around falls prevention^{34,35} but access to comprehensive programmes varies across the country.^{6,36} After a fragility fracture, most people have access to a four-week rehabilitation course including muscle strengthening and balance training.¹⁶ For residents in nursing homes, there are standards for falls prevention³⁷ and, in some regions such as Bavaria, falls prevention programmes have been implemented successfully.³⁴ Furthermore, in recent years, a range of innovative care models and technologies has been developed, such as a mobile-device-based geriatric assessment,³⁸ looking to promote healthy and active ageing while reducing costs to the health system.

Engaging patients and public: awareness, activation and self-management

Germany has six patient-focused osteoporosis organisations which have contributed to improved knowledge, but gaps in self-management remain.^{5,39} They have established more than 300 patient support groups⁴⁰ and often run physical activity programmes to help participants manage their osteoporosis, and have been shown to have a positive impact on long-term treatment and management.^{41,42} At the same time, patient organisations have highlighted that people often have too little guidance on finding an osteoporosis specialist and deciding on the most appropriate treatment.¹² Many people do not seek investigation of osteoporosis⁴³ and a large proportion of those who have been diagnosed struggle to stay on their osteoporosis medication. In a recent study, more than half of osteoporosis patients in Germany discontinued their treatment within the first year of being put on osteoporosis medication.⁴⁴



Healthy Kinzigtal (Gesundes Kinzigtal), Germany



Tread Safely (Trittsicher), Germany

References

1. Hernlund E, Svedbom A, Ivergard M, et al. 2013. Osteoporosis in the European Union: medical management, epidemiology and economic burden. A report prepared in collaboration with the International Osteoporosis Foundation (IOF) and the European Federation of Pharmaceutical Industry Associations (EFPIA). *Arch Osteoporos* 8: 136
2. Hadji P, Klein S, Gothe H, et al. 2013. The Epidemiology of Osteoporosis. *Dtsch Arztebl Int* 110(4): 52-57
3. International Osteoporosis Foundation. 2018. *Broken bones, broken lives: A roadmap to solve the fragility fracture crisis in Germany*. Nyon: IOF
4. Bleibler F, Rapp K, Jaensch A, et al. 2014. Expected lifetime numbers and costs of fractures in postmenopausal women with and without osteoporosis in Germany: a discrete event simulation model. *BMC Health Serv Res* 14(1): 284
5. Kurth A. 2019. Interview with Kirsten Budig at The Health Policy Partnership [Telephone]. 18/09/2019
6. Dreinhöfer K. 2019. Interview with Kirsten Budig at The Health Policy Partnership. 18/09/2019
7. Bundesministerium für Gesundheit. 2019. Präventionsgesetz. Available from: <https://www.bundesgesundheitsministerium.de/service/begriffe-von-a-z/p/praeventionsgesetz.html> [Accessed 07/11/2019]
8. Kostuj T, Klady B, Hoffmann R. 2016. [Registries of the German Society for Orthopaedics and Trauma : Overview and perspectives of the DGU and DGOOC registries]. *Unfallchirurg* 119(6): 463-8
9. Eb. 2016. Geriatrie: „AltersTraumaRegister“ gestartet. *Dtsch Arztebl Int* 113(14): A-664-A-64
10. Stengel D, Dreinhofer K, Kostuj T. 2016. Einfluss von Registern auf die Versorgungsqualität. *Der Unfallchirurg* 119
11. Beirer M, Kirchoff C, Biberthaler P. 2017. Development of a German fracture register to assess current fracture care and improve treatment quality: A feasibility study. *EFORT Open Rev* 2(12): 474-77
12. Bundesselbsthilfeverband für Osteoporose e.V. 2019. BfO fordert kompetente Begleitung der Patienten. Available from: <https://www.osteoporose-deutschland.de/bfo-fordert-kompetente-begleitung-der-patienten/> [Accessed 28/08/2019]
13. Ärzte Zeitung. 2010. Integrierte Versorgung kann Compliance bei Osteoporose verbessern. Available from: <https://www.aerztezeitung.de/Politik/Integrierte-Versorgung-kann-Compliance-bei-Osteoporose-verbessern-213930.html> [Accessed 29/08/2019]
14. Haasters F, Prall WC, Himmeler M, et al. 2015. Prävalenz und Management der Osteoporose in der Unfallchirurgie. *Der Unfallchirurg* 118(2): 138-45
15. Gross T. 2018. Keine Therapie trotz spezifischer Facharzt-Empfehlung? *Praxis* 107(11): 573-84
16. Dachverbands der Deutschsprachigen Wissenschaftlichen Osteologischen Gesellschaften e.V. 2017. Prophylaxe, Diagnostik und Therapie der OSTEOPOROSE bei postmenopausalen Frauen und bei Männern.
17. Kurth AA, Salzmann M, Stumpf U, et al. 2018. Eine regionale Analyse der Tertiärprävention. *Osteologie* 27(03): 135-43
18. Schray D, Neuerburg C, Stein J, et al. 2016. Value of a coordinated management of osteoporosis via Fracture Liaison Service for the treatment of orthogeriatric patients. *Eur J Trauma Emerg Surg* 42(5): 559-64
19. Heberlein I, Demary W, Bloching H, et al. 2011. [Diagnosis and treatment of osteoporosis and rheumatoid arthritis in accordance with German guidelines. Results of a survey of patients, primary care physicians and rheumatologists]. *Z Rheumatol* 70(7): 592-601
20. Osteoporose Selbsthilfegruppen Dachverband e.V. 2019. Knochendichtemessung als Kassenleistung. Wann zahlt die Krankenkasse? Available from: <https://www.osd-ev.org/osteoporose/knochendichtemessung/knochendichtemessung-als-kassenleistung/> [Accessed 07/11/2019]
21. Niedhart C, Preising A, Eichhorn C. 2013. Signifikante Reduktion von Krankenhauseinweisungen aufgrund osteoporoseassoziierter Frakturen durch intensiviertere multimodale Therapie – Ergebnisse der Integrierten Versorgung Osteoporose Nordrhein. *Z Orthop Unfall* 151(01): 20-24
22. Institut für Qualität und Wirtschaftlichkeit im Gesundheitswesen (IQWiG). 2018. Leitliniensynopse zum DMP Osteoporose - Rapid Report.
23. Schmolke MA, Ernst M, Seger W. 2017. Brüchiger Knochen, harte Fakten: Fehl- und Unterversorgung der Osteoporose. *G&S Gesundheits- und Sozialpolitik* 71(2): 45-51
24. Hesse E, Bocker W, Kammerlander C, et al. 2019. [Establishment of fracture liaison services in Germany]. *Unfallchirurg*: 10.1007/s00113-019-00705-5
25. Deutsche Gesellschaft fuer Geriatrie e.V. 2015. atz: "Alterstraumatologisches Zentrum" – ein geriatrisches Zertifikationsverfahren. Available from: <https://www.dggeriatrie.de/ueber-uns/positionen-der-dgg/926-atz-alterstraumatologisches-zentrum-%e2%80%93-ein-geriatrisches-zertifikationsverfahren> [Accessed 28/08/2019]
26. Jung K, Krause U. 2017. Fünzigstes AltersTraumaZentrum DGU@ zertifiziert. *Orthopädie und Unfallchirurgie* 7(1): 64-65
27. Grund S, Roos M, Duchene W, et al. 2015. Evaluation eines Versorgungskonzepts für die Alterstraumatologie. *Dtsch Arztebl Int* 112(7): 113-19
28. Biber R, Singler K, Curschmann-Horter M, et al. 2013. Implementation of a co-managed Geriatric Fracture Center reduces hospital stay and time-to-operation in elderly femoral neck fracture patients. *Arch Orthop Trauma Surg* 133(11): 1527-31
29. Rausch V, Schwarzer A, Dietrich JW, et al. 2018. We miss the opportunity: Pretreatment of osteoporosis in a German trauma center. *PLoS One* 13(11): e0207122
30. Hadji P, Gottschalk F, Wilke T, et al. 2019. Prevalence and incidence of patients with an osteoporosis diagnosis and high fracture risk. *Osteologie* 28(01): P 17
31. Gosch M, Druml T, Nicholas JA, et al. 2015. Fragility non-hip fracture patients are at risk. *Arch Orthop Trauma Surg* 135(1): 69-77
32. International Osteoporosis Foundation. 2019. Capture the Fracture. Map of best practice. Available from: https://www.capturethefracture.org/map-of-best-practice-page?field_rating_tid=All&country=de [Accessed 30/08/2019]
33. Wolters W, Rossmann M, Pommerening J, et al. 2016. Establishment of a large sector-spanning fracture liaison service in Germany. *Bone Abstracts*: 10.1530/boneabs.5.P411
34. Bundesministerium für bildung und forschung. 2011. Training statt Bettruhe verhindert Oberschenkelhalsbrüche. Präventionsmaßnahmen in Pflegeheimen könnten bis zu 40 Millionen Euro sparen. Available from: <https://www.gesundheitsforschung-bmbf.de/de/training-statt-bettruhe.php> [Accessed 20/09/2019]
35. Becker C. 2017. Prävention von Stürzen und sturzbedingten Verletzungen. *Z Gerontol Geriatr* 50(8): 672-75
36. Rapp K, Kampe K, Roigk P, et al. 2016. The osteoporotic fracture prevention program in rural areas (OFRA): a protocol for a cluster-randomized health care fund driven intervention in a routine health care setting. *BMC Musculoskelet Disord* 17(1): 458-58
37. Schmidt S. 2016. *Expertenstandard Sturzprophylaxe in der Pflege. Expertenstandards in der Pflege - eine Gebrauchsanleitung*. Berlin, Heidelberg: Springer Berlin Heidelberg: 85-106
38. Linder. 2019. Linder. Available from: <https://www.linder.de/> [Accessed 09/08/2019]
39. Kanis JA, Borgstrom F, Compston J, et al. 2013. SCOPE: a scorecard for osteoporosis in Europe. *Arch Osteoporos* 8: 144
40. Bundesselbsthilfeverband für Osteoporose e.V. 2019 Was macht der Verband? Available from: <https://www.osteoporose-deutschland.de/ueber-uns/was-macht-der-verband/> [Accessed 21/11/2019]
41. Bundesselbsthilfeverband fuer Osteoporose e.V. 2019. Daten und Fakten. Available from: <https://www.osteoporose-deutschland.de/osteoporose/daten-und-fakten/> [Accessed 27/08/2019]
42. Bundesselbsthilfeverband fuer Osteoporose e.V. 2019. Leben mit Osteoporose. Available from: <https://www.osteoporose-deutschland.de/interview-leben-mit-osteoporose/> [Accessed 30/09/2019]
43. Kathmann W. 2018. Fracture Liaison Service. Bessere Abklärung von Osteoporose. Ärzte Zeitung. Available from: https://www.aerztezeitung.de/medizin/krankheiten/skelett_und_weichteilkrankheiten/osteoporose/article/955174/fracture-liaison-service-bessere-abklaerung-osteoporose.html [Accessed 28/09/2019]
44. Hadji P, Jacob L, Kostev K. 2016. Gender- and age-related treatment compliance in patients with osteoporosis in Germany. *Patient Prefer Adherence* 10: 2379-85

Osteoporosis and fragility fracture prevention in Ireland



Falls and fragility fractures have gained national policy attention in recent years, although osteoporosis is not generally viewed as a policy priority in Ireland.

Collaborative efforts between clinicians and national organisations have resulted in the development of new programmes, such as a national hip fracture database, which are having a meaningful impact on the management of fragility fractures.

Burden and impact of osteoporosis and fragility fractures

Osteoporosis and fragility fractures impose a considerable burden on the health system in Ireland, which will increase significantly as the population ages. Osteoporosis was estimated to affect 20% of women and 6.2% of men over 50 in Ireland in 2010.¹ Furthermore, approximately one in two women and one in five men over 50 in Ireland will experience a fracture in their lifetime.² In 2010, this amounted to 18,000 new fragility fractures, and this is set to rise to 28,000 by 2025 due to population ageing.¹ Treatment for falls and fragility fractures cost an estimated €402 million per year in 2012, a figure that is expected to exceed €1,587 million by 2030.²

Building a system that works: policies for scrutiny, accountability and investment

While osteoporosis may not be recognised as a national health priority, prevention of falls and fragility fractures is beginning to gain attention at the national level. Published in 2008, the *Strategy to Prevent Falls and Fractures in Ireland's Ageing Population*³ discusses the burden and risk factors of falls and fractures in Ireland. This includes an overview of osteoporosis and recommendations for reducing the burden of falls and fractures.³ While there do not appear to be more recent policies or strategies for fracture prevention, this strategy led to the development of a national programme on falls and bone health, which is ongoing.⁴ However, osteoporosis does not seem to be positioned as a priority condition in national policy,⁵ and funding for programmes that aim to better manage osteoporosis appears to be limited.^{5,6}

The Irish Hip Fracture Database (IHFD) is a well-established audit of hip fracture management and outcomes in Ireland. It was introduced in 2012 to improve the quality of hip fracture care in hospitals, as assessed against international standards.⁷ All 16 acute hospitals in the country participate in the audit and upload data on patients aged 60 and older who are admitted for a hip fracture.⁸ In 2018, data coverage reached 99%, and 10 hospitals achieved 100% data coverage.⁹ Care of people with hip fractures is assessed against six standards and reported annually by site, to allow hospitals to identify key areas for improvement.⁸ Data on other fragility fractures are not yet collected, although a fracture liaison service (FLS) database is reported to be in development.^{5,6}

Reimbursement policy in Ireland supports access to osteoporosis treatment, although access to dual-energy X-ray absorptiometry (DXA) scans may vary. Doctors may prescribe any approved osteoporosis treatment they believe to be most appropriate,⁵ and much of the cost of osteoporosis medications is reimbursed through the national Drugs Payment Scheme.¹⁰ This supports good access to treatment.¹¹ However, reimbursement of DXA scans may vary between insurance companies, and there may be limited availability of this service in public hospitals.¹¹

Catching it early: detection and management in primary care

Clinical guidance supports the use of DXA scans to assess fragility fracture risk before the first fracture.² The Irish Osteoporosis Society (IOS) has published guidance highlighting the value of identifying fracture risk before a fracture occurs and specifies a range of indications for DXA scanning.² While this guidance is shared with every general practitioner (GP) in Ireland, it may not always be put into practice.⁵ As a result, osteoporosis may go undiagnosed even after multiple fractures have occurred.⁵

A Fracture Risk Assessment Tool (FRAX[®]) for Ireland is available but it remains unclear whether it is widely used. While a country-specific FRAX[®] tool has been developed and calibrated using national hip fracture data,¹² clinical guidance does not specify how this should be used to inform decision-making² and it is not recommended by the IOS due to its limitations.⁵ Clinical guidance states that osteoporosis should be diagnosed using a DXA scan



After a person has had a fragility fracture and been diagnosed, to prevent further fractures, it is essential that all causes of bone loss are investigated and addressed and the most appropriate medication prescribed for that person. Prevention of fractures should also be a priority, starting in utero and continuing throughout life.



**MOIRA O'BRIEN,
IRISH OSTEOPOROSIS SOCIETY**

in combination with detailed clinical information and blood tests, and use of an online self-assessment is also promoted by the IOS.^{2,5} Guidance also details each of the available medications.²

Getting people back on track: facilitating multidisciplinary post-discharge care

Orthogeriatric services are relatively new to Ireland, but geriatric or orthogeriatric care of older people with hip fractures is increasing rapidly. In 2014, there was only one orthogeriatrician appointed in Ireland,⁷ and in 2016, seven of 16 hospitals had at least some orthogeriatric involvement in hip fracture management.¹³ Since then, orthogeriatrics services have been introduced in more hospitals,⁸ and more than two thirds of people with hip fractures are now seen by a geriatrician while in hospital.⁹

The IHFD has supported annual improvements in hip fracture management and outcomes, although gaps remain. Key metrics that improved between 2017 and 2018 include the proportion of people who were seen by a geriatrician in hospital, the proportion who received a bone health assessment and the proportion who received a specialist falls assessment.⁹ The proportion of people who were admitted to an orthopaedic ward or theatre from the emergency department within the target time of four hours increased between 2017 and 2018, but remains low at 17%.⁹ An expert interviewed for this country profile suggested that achievement of this target may be hindered by wider health system issues such as hospital overcrowding.⁶ In addition, there is notable variation between hospitals in terms of service provision and achievement of best-practice standards.⁹

A pay-for-performance incentive scheme has recently been introduced and is further contributing to improvements in hip fracture outcomes. The hip fracture Best Practice Tariff, Ireland's only incentive payment scheme for hospitals, was introduced in 2018.^{6,9} Through this scheme, eligible hospitals receive an incentive payment of €1,000 for every patient whose management meets eight standards of care per patient.⁹ To be eligible for this scheme, hospitals must submit at least 90% of eligible data and must have in place an audit coordinator, a clinical lead and a hip fracture governance committee.⁹ In the first year, €278,000 was paid to hospitals through



Orthogeriatric service, Ireland



The Best Practice Tariff is already having a huge impact on hip fracture outcomes. It is particularly helpful for reaching the criteria that are more difficult to achieve.

**CONOR HURSON,
IRISH HIP FRACTURE DATABASE**



the scheme, representing 7% of hip fractures in the country.⁹ Data from the IHFD show that some measures of hip fracture management have improved considerably since the introduction of the Best Practice Tariff.⁹

Some Irish hospitals have established FLS, but data are limited. When last assessed in 2016, seven out of 16 hospitals had a fracture liaison nurse.¹³ As a national FLS database has not yet been implemented, it is not clear how many FLS are currently in place or what impact these services are having on fracture outcomes. Only five services in Ireland are registered with Capture the Fracture®; two have received a silver rating, two have received bronze and one is currently under review.¹⁴

Supporting quality of life as part of healthy and active ageing: prevention of falls and fractures in later life

National strategies support the development of falls prevention services. With a rapidly ageing population, the incidence of falls in some areas is rising quickly and there is a clear need to implement comprehensive falls prevention programmes.¹⁵ As mentioned above, a national strategy on falls and fracture prevention was published in 2008,³ which gave rise to the AFFINITY National Falls and Bone Health Project in 2013.⁴ This national project aims to foster integration of key services and develop a comprehensive falls and fracture prevention strategy.¹⁶ Specifically, the project aims to develop guidance for community falls services and establish a falls and bone health information service for the public.¹⁶ It also highlights the importance of integrating prevention and rehabilitation services to reduce both falls and their impact on the health and wellbeing of older people.⁴

Engaging patients and public: awareness, activation and self-management

The IOS is a highly active patient organisation seeking to raise awareness of osteoporosis among clinicians and the public. The society's President has emphasised the critical importance of educating the public about osteoporosis, suggesting that educating people with osteoporosis will lead to better management of the condition and fewer fracture-related hospital admissions.⁵ To improve public awareness, the IOS publishes extensive information about prevention and management of osteoporosis on its website^{17,18} and runs a national helpline where members of the public can submit queries.^{5,19} It also aims to engage with GPs to educate them about osteoporosis and current guidance.⁵ Despite these efforts, awareness of osteoporosis in Ireland still seems to be low.⁵

Use of osteoporosis medication is suboptimal in Ireland. One year after being prescribed osteoporosis medication, 64% of women and 60% of men are still taking it.²⁰ After three years, 45% of women and 29% of men continue taking the medication.²⁰ Improved engagement in primary care may be needed as 30% of people on osteoporosis medication go five years without having their treatment reviewed by a GP²¹ even though it has been recommended that bone health be monitored via repeat DXA scans up to every two years.^{2,5}



References

1. Svedbom A, Hernlund E, Ivergard M, *et al.* 2013. Osteoporosis in the European Union: a compendium of country-specific reports. *Arch Osteoporos* 8: 137
2. Irish Osteoporosis Society. 2012. *Osteoporosis guidelines 2 for health professionals*. Dublin: Irish College of General Practitioners
3. Health Service Executive. 2008. *Strategy to prevent falls and fractures in Ireland's ageing population*. Dublin: Health Service Executive
4. Health Service Executive. About AFFINITY national falls and bone health project 2018-2023. Available from: <https://www.hse.ie/eng/services/list/4/olderpeople/falls-prevention-and-bone-health/> [Accessed 13/11/19]
5. O'Brien M. 2019. Interview with Taylor Morris at The Health Policy Partnership [telephone]. 25/11/19
6. Hurson C. 2019. Interview with Taylor Morris at The Health Policy Partnership [telephone]. 15/11/19
7. Ellanti P, Cushen B, Galbraith A, *et al.* 2014. Improving hip fracture care in Ireland: a preliminary report of the Irish hip fracture database. *J Osteoporos* 2014: 656357
8. National Office of Clinical Audit. 2018. *Irish Hip Fracture Database national report 2017*. Dublin: NOCA
9. National Office of Clinical Audit. 2019. *Irish Hip Fracture Database national report 2018*. Dublin: NOCA
10. Health Service Executive. Drugs Payment Scheme. [Updated 01/11/18]. Available from: <https://www2.hse.ie/services/drugs-payment-scheme/drugs-payment-scheme-card.html> [Accessed 25/11/19]
11. Kanis JA, Borgstrom F, Compston J, *et al.* 2013. SCOPE: a scorecard for osteoporosis in Europe. *Arch Osteoporos* 8: 144
12. McGowan B, Kanis JA, Johansson H, *et al.* 2013. Development and application of FRAX in the management of osteoporosis in Ireland. *Arch Osteoporos* 8: 146
13. National Office of Clinical Audit. 2017. *Irish Hip Fracture Database national report 2016*. Dublin: NOCA
14. Capture the Fracture. Map of Best Practice. Available from: <https://www.capturethefracture.org/map-of-best-practice> [Accessed 18/11/19]
15. Fan CW, Duggan J, Rodger D, *et al.* 2017. Increased number of community-living older adults attending an emergency department with falls and fractures: North Dublin experience. *Ir J Med Sci* 186(3): 693-97
16. Health Service Executive. 2019. *Update on AFFINITY national falls and bone health project - May 2019*. Dublin: HSE
17. Irish Osteoporosis Society. Diet and Osteoporosis. Available from: <https://www.irishosteoporosis.ie/treatments/diet-osteoporosis/> [Accessed 21/11/19]
18. Irish Osteoporosis Society. Hints and tips for dealing with osteoporosis. Available from: <https://www.irishosteoporosis.ie/treatments/hints-tips-dealing-osteoporosis/> [Accessed 21/11/19]
19. Irish Osteoporosis Society. Contact us. Available from: <https://www.irishosteoporosis.ie/contact-us/> [Accessed 25/11/19]
20. Hiligsmann M, McGowan B, Bennett K, *et al.* 2012. The Clinical and Economic Burden of Poor Adherence and Persistence with Osteoporosis Medications in Ireland. *Value Health* 15(5): 604-12
21. O'Connor R, O'Regan A, O'Doherty J. 2018. Management of Bone Fragility in Primary Care in Ireland. *Ir Med J* 111(1): 674

Osteoporosis and fragility fracture prevention in Italy

The Italian government has recognised the importance of integrated osteoporosis, fragility fracture and falls prevention as a policy priority. Furthermore, the government is active in promoting best-practice management of osteoporosis at a national level. Despite this, large variations in access to early diagnosis and treatment occur at the regional level, leaving many people without access to optimal osteoporosis or fragility fracture care and prevention services.

Burden and impact of osteoporosis and fragility fractures

A significant number of people in Italy are affected by osteoporosis and fragility fractures. Osteoporosis affects around 23% of women and 7% of men over the age of 50.¹ Fragility fractures are also very common, with more than half a million occurring in 2017.¹

Fragility fractures are costly for the Italian healthcare system.¹ An estimated €9.45 billion was spent on fractures in 2017, with hip fractures incurring 59% of total fracture-related costs.¹ By 2030, costs are set to increase by 26.2% to €11.9 billion.¹

Building a system that works: policies for scrutiny, accountability and investment

Osteoporosis is a priority for the Ministry of Health (Ministero della Salute) in Italy.

In 2018, the National Intervention Strategy for Osteoporosis was finalised by the Ministry of Health in collaboration with scientific societies. This strategy aims to define an overall systematic approach to the prevention, diagnosis and treatment of osteoporosis in Italy and ensure greater continuity of care and multidisciplinary collaboration.²

Fragility fractures are integrated into prevention plans in Italy. The National Prevention Plan (NPP) led by the Ministry of Health defines objectives at the national level, following which regional prevention plans are created.³ The latest NPP for 2014-2018 identified 'hospitalisation due to fragility fractures for patients over 75 years old' as a key performance indicator to measure physical activity, and set a 15% reduction target by the end of 2018, although it is unclear whether this target has been reached.^{1,4}

The framework for a national register for fragility fractures has been established, but adaptation and implementation in the country's regions is uneven. The need for more comprehensive epidemiological data on fragility fractures in Italy prompted the Ministry of Health to develop the Italian Registry for Fragility Fractures (Registro Italiano delle Fratture da Fragilità) in 2015.⁵ The registry aims to collect data on the socioeconomic impact of fragility fractures in Italy, assess the effectiveness of health policy interventions and allocate resources more appropriately.⁵ However, while frameworks for data collection have been created at a national level, many regions still need to implement databases to allow for appropriate tracking of data against indicators.¹

Restrictions in the reimbursement of diagnostic tests in Italy can result in unequal access to care.⁶ Dual-energy X-ray absorptiometry (DXA) scans are reimbursed by the Italian public health system, but there are some restrictions on eligibility for full reimbursement. For example, women aged 65 and over without additional risk factors are excluded, meaning osteoporosis is still largely undiagnosed among postmenopausal women.⁶

Osteoporosis treatments are reimbursed in Italy for certain groups. This includes people with a history of one or more previous fragility fractures, postmenopausal women, and men over 50 years of age with certain risk factors (depending on bone mineral density score).⁷

Catching it early: detection and management in primary care

Variation in access to diagnostic tools has led to delays in diagnosis. Despite the high availability of DXA machines, the average waiting time to receive a DXA bone scan in Italy is approximately 83 days.^{8,9} Many DXA units are situated in research centres or private hospitals and are only available in some parts of the country, which means that people face a 'diagnostic lottery' depending on where they live.⁹

A range of tools to assess fracture risk are available in Italy. A country-specific Fracture Risk Assessment Tool (FRAX[®]) is widely used for evaluating the risk of a fragility fracture.⁷ In addition, a FRAX[®]-derived algorithm called FRAHS was recently developed for use among general practitioners to assess risk in primary care.^{7,10} Other tools developed in Italy, such as Derived Fracture Risk Assessment (DeFRA), have not yet been validated on a large scale.⁷

Getting people back on track: facilitating multidisciplinary post-discharge care

The importance of multidisciplinary care following a fragility fracture is highlighted in a range of guidance documents. Various scientific societies, including the Italian Society of Orthopaedics and Traumatology (Società Italiana de Ortopedia e Traumatologia; SIOT), the Italian Society of Osteoporosis, Mineral Metabolism and Skeletal Diseases (Società Italiana dell'Osteoporosi del Metabolismo Minerale e delle Malattie dello Scheletro; SIOMMMS) and the Italian Society of Rheumatology (Società Italiana di Reumatologia; SIR), have developed recommendations on integrated and multidisciplinary models for the management of osteoporosis and fragility fractures.^{7,10} These have been implemented in some areas, as demonstrated by the multidisciplinary hip fracture unit in Careggi University Hospital.^{11,12}

Case study

Multidisciplinary hip fracture unit at Careggi University Hospital, Italy

Access to multidisciplinary care models for people with fractures is variable, however.

In some regions, plans exist for multidisciplinary care for fragility fractures, known as PDTA (Percorso Diagnostico-Terapeutici Assistenziali, or Diagnostic Therapeutic Assistant Pathway).^{13,14} While these support access to models of care based on the fracture liaison service model, they are not available in all parts of the country.¹⁵ In fact, fewer than 3% of Italian hospitals have established referral systems for fracture patients.¹

As a consequence of these regional disparities,¹⁶ many Italian patients do not receive optimal care following a fragility fracture.^{1,15,17} More than 75% of elderly patients do not receive any medication for osteoporosis on discharge from hospital after a hip fracture.^{1,18} Failure to provide appropriate treatment in hospital can lead to an increased risk of subsequent fractures and premature death.¹⁷

Supporting quality of life as part of healthy and active ageing: prevention of falls and fractures in later life

National osteoporosis and fragility fracture guidelines discuss the importance of making lifestyle and behavioural changes to prevent falls. These highlight physical activity and vitamin D intake as key measures to reduce the risk of fractures among older people.^{10,19} In addition, the Ministry of Health provides guidance for falls prevention and management of people in hospitals and nursing homes.²⁰ Emphasis is placed on the provision of risk assessment tools, healthcare professional training and physical activity interventions.²⁰

Despite national guidance, the level of support that older people receive following a fragility fracture is quite variable. Home-based rehabilitation is not available in all regions and is provided at the discretion of local health authorities.¹⁶ In addition, the Italian health system does not provide any specific reimbursement for home assistance for older patients with significant disabilities and multiple conditions.¹⁶

Engaging patients and public: awareness, activation and self-management

Discontinuation of osteoporosis treatment leaves many people at risk of further fractures.²¹ A 2013 study undertaken in the Campania region found that 70% of Italian patients had discontinued their osteoporosis medication after six months and only 14% were on medication one year after initiation.²² Common reasons include side effects and a lack of motivation.²³

Improving knowledge of osteoporosis among patients and the public may play a crucial role in supporting people to keep taking medication.²⁴ While public information about osteoporosis is available online through the Ministry of Health²⁵ and national societies, there is an urgent need for national awareness campaigns that address the links between fragility fractures and osteoporosis, and highlight the safety and long-term effectiveness of medication in preventing future fractures.²⁴

References

- International Osteoporosis Foundation. 2019. *Broken Bones, Broken Lives: A roadmap to solve the fragility fracture crisis in Italy*. Nyon: IOF
- Ministero della Salute. 2018. Una strategia di intervento per l'osteoporosi. Available from: http://www.salute.gov.it/portale/news/p3_2_1_1_1.jsp?lingua=italiano&menu=notizie&p=dalministero&id=3365 [Accessed 25/09/19]
- Morciano L, Caredda E. 2018. The Governance of Prevention in Italy. *Biomedicine and Prevention* 3(173): 223-25
- Ministero della Salute. 2015. Ridurre il carico prevenibile ed evitabile di morbosità, mortalità e disabilità delle malattie non trasmissibili. Available from: http://www.salute.gov.it/portale/temi/p2_6.jsp?lingua=italiano&id=4241&area=prevenzione&menu=obiettivi [Accessed 25/09/19]
- Tarantino U, Feola M, Rao C, et al. 2011. Epidemiologia delle fratture da fragilità nel Lazio: approccio globale e nostra esperienza. *Archivio di Ortopedia e Reumatologia* 122(3): 10-12
- Brandi ML, Guglielmi G, Masala S, et al. 2012. When the government actively faces the burden of osteoporosis: the Italian experience. *Arch Osteoporos* 7: 21-4
- Tarantino U, Iolascon G, Cianferotti L, et al. 2017. Clinical guidelines for the prevention and treatment of osteoporosis: summary statements and recommendations from the Italian Society for Orthopaedics and Traumatology. *J Orthop Traumatol* 18(1): 3-36
- Svedbom A, Hernlund E, Ivergard M, et al. 2013. Osteoporosis in the European Union: a compendium of country-specific reports. *Arch Osteoporos* 8: 137
- Kanis JA, Borgstrom F, Compston J, et al. 2013. SCOPE: a scorecard for osteoporosis in Europe. *Arch Osteoporos* 8: 144
- Nuti R, Brandi ML, Checchia G, et al. 2019. Guidelines for the management of osteoporosis and fragility fractures. *Intern Emerg Med* 14(1): 85-102
- Rostagno C, Cartei A, Buzzi R, et al. 2013. Multidisciplinary approach to hip fracture in the elderly: florence experience. *Emerg Med* 3: 148-52
- Rostagno C, Cartei A, Civinini R, et al. 2018. Hip fracture unit: beyond orthogeriatrics. *Intern Emerg Med* 13(5): 637-39
- REGIONE FRIULI VENEZIA GIULIA: Direzione centrale salute integrazione socio sanitaria politiche sociali e famiglia. 2016. Percorso Assistenziale del Paziente con Osteoporosi: Indicazioni di Appropriatazza per il Riferimento Allo Specialista Reumatologo. Available from: http://www.malatiereumaticifvg.org/malattie/docs/Percorso%20Assistenziale_%20Osteoporosi%20-%20Artrosi.pdf [Accessed 25/09/19]
- REGIONE LOMBARDIA: Azienda Socio-Sanitaria Territoriale di Pavia. 2016. Percorso Diagnostico Terapeutico Assistenziale Ospedale - Territorio per Pazienti con Fratture da Fragilità e con Osteoporosi. Available from: http://www.asst-pavia.it/sites/default/files/documenti/PIC%20Cont%20assist%20osp_terr%20pz%20fratture%20e%20osteoporosi%20rev%200%202016_0.pdf [Accessed 25/09/19]
- Il Papavero Rosso Web. 2018. Fratture da fragilità: linee guida dedicate, percorso diagnostico terapeutico assistenziale standard e tempestività di intervento. Available from: <https://www.ilpapaverorossoweb.it/article/fratture-da-fragilit%C3%A0-linee-guida-dedicate-percorso-diagnostico-terapeutico-assistenziale> [Accessed 24/09/19]
- Pioli G, Pellicciotti F, Davoli ML, et al. 2010. Hip fracture management and outcomes in Italy. *Eur Geriatr Med* 1(2): 104-07
- Degli Esposti L, Sinigaglia L, Rossini M, et al. 2012. Adherence to therapeutic and diagnostic recommendations in patients with femur fracture and at risk of re-fracture or death: results of an analysis of administrative databases. *Reumatismo* 64(1): 18-26
- Gonnelli S, Caffarelli C, Iolascon G, et al. 2017. Prescription of anti-osteoporosis medications after hospitalization for hip fracture: a multicentre Italian survey. *Aging Clin Exp Res* 29(5): 1031-37
- Rossini M, Adami S, Bertoldo F, et al. 2016. Guidelines for the diagnosis, prevention and management of osteoporosis. *Reumatismo* 68(1): 1-39
- Ministero della Salute. 2011. Raccomandazione Per La Prevenzione E La Gestione Della Caduta Del Paziente Nelle Strutture Sanitarie. Available from: http://www.salute.gov.it/imgs/C_17_pubblicazioni_1639_allegato.pdf [Accessed 25/09/19]
- Imaz I, Zegarra P, Gonzalez-Enriquez J, et al. 2010. Poor bisphosphonate adherence for treatment of osteoporosis increases fracture risk: systematic review and meta-analysis. *Osteoporos Int* 21(11): 1943-51
- Iolascon G, Gimigliano F, Orlando V, et al. 2013. Osteoporosis drugs in real-world clinical practice: an analysis of persistence. *Aging Clin Exp Res* 25(1): 137-41
- Rossini M, Bianchi G, Di Munno O, et al. 2006. Determinants of adherence to osteoporosis treatment in clinical practice. *Osteoporos Int* 17(6): 914-21
- Bianchi ML, Duca P, Vai S, et al. 2015. Improving adherence to and persistence with oral therapy of osteoporosis. *Osteoporos Int* 26(5): 1629-38
- Ministero della Salute. 2015. Aiuta le tue ossa! A tavola, con attività fisica e sole. Osteoporosi e stili di vita. Available from: http://www.salute.gov.it/imgs/C_17_opuscoliPoster_258_allegato.pdf [Accessed 28/09/19]

Osteoporosis and fragility fracture prevention in the Netherlands



Osteoporosis and fragility fractures are not prioritised in national health policies in the Netherlands and there is considerable variation in delivery of key services across the country. Recent developments such as the National Hip Fracture Audit and the establishment of fracture liaison services are supporting improvements in care, but have primarily been driven by professional organisations.

Burden and impact of osteoporosis and fragility fractures

The burden of osteoporosis in the Netherlands is considerable and incurs high costs. Osteoporosis is estimated to affect up to 23% of women and 6% of men aged 50 and over.¹ This contributes to around 76,000 fragility fractures per year.¹ In 2010, the estimated cost associated with osteoporosis was €824 million, a figure which is estimated to rise to €1.1 billion by 2025.¹

Building a system that works: policies for scrutiny, accountability and investment

While the Dutch government has a strong focus on prevention, it does not appear to prioritise osteoporosis and fragility fractures. There is currently considerable policy focus on prevention,² with the ambition of supporting health throughout life and ensuring that older people can maintain good health for as long as possible. However, the National Prevention Agreement focuses on lifestyle factors, while specific conditions such as osteoporosis are not addressed.² An expert commentator has suggested that diseases such as diabetes, which has a more visible impact on health, are usually prioritised over osteoporosis, which does not cause symptoms until a fracture occurs.³

A national hip fracture registry has recently been established with the aim of improving hip fracture management. The Dutch Hip Fracture Audit began collecting data in 2016 and produced its first report in 2017.⁴ Initiation of this audit, part of the Dutch Institute for Clinical Auditing, resulted from multidisciplinary collaboration between numerous professional societies.⁴ While improvements in care have yet to be reported, the audit has been used to identify gaps in care across the Netherlands and is currently supporting three pilot projects to improve and standardise hip fracture monitoring and care.⁵

The health insurance system in the Netherlands supports universal access to key services for osteoporosis and fragility fracture prevention. The Health Insurance Act ensures that all people in the Netherlands are covered by a basic health insurance policy.⁶

The government specifies which services must be included in the basic package, which covers most essential medical care, hospital services and medications.⁶ As a result, people in the Netherlands seem to have good and equitable access to medications and services for fragility fracture prevention and treatment.³

Catching it early: detection and management in primary care

While guidelines for preventing fragility fractures have been developed for primary care, detection of osteoporosis is often not a priority.³ National guidance for fracture prevention in primary care focuses on preventing subsequent fractures among people who have already experienced a fracture. The guidelines specify that general practitioners should only proactively investigate osteoporosis in people who have already sustained a fragility fracture.⁷

Coupled with low levels of patient engagement with post-fracture services,⁸ this has contributed to considerable underdiagnosis of osteoporosis.⁹ In 2010, when the number of people with osteoporosis in the Netherlands was last recorded, only 148,200 people had been officially diagnosed.⁹ This represents just 4.3% of women over 50 and 0.5% of men over 50, up to five times less than the proportion of the population estimated to be living with the disease.^{1,9}

Getting people back on track: facilitating multidisciplinary post-discharge care

Best-practice guidelines promote multidisciplinary care of people with hip fractures, although hospital performance varies.⁴ The Dutch Guideline on Multidisciplinary Treatment of Frail Elderly During Surgical Procedures was developed in 2016 to promote multidisciplinary care and support standardised practice across the country.¹⁰ These guidelines call for the involvement of orthogeriatrics and other services such as falls prevention, primary care and social services. Data from the Dutch Hip Fracture Audit show that, in 2018, 70% of hip fracture patients over 70 received orthogeriatric care that started before surgery, but with wide variation in performance between hospitals.⁵ However, the impact of these guidelines on patient outcomes has not yet been reported.

“ Having a network of professionals involved in fracture liaison services has really helped to improve and increase the use of these services. ”

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Fracture liaison services (FLS) are well-established in the Netherlands, but identification of osteoporosis following a fracture is still suboptimal.⁹ Most hospitals in the Netherlands have established an FLS to conduct post-fracture diagnosis of osteoporosis and initiate treatment.⁹ This seems to have been driven by a network of professionals working to increase the number of FLS in the Netherlands.³ However, there is considerable variation in the services provided by FLS across the country, with experts calling for standardised guidance.¹¹ In addition, low patient engagement with FLS is a key barrier to identification and treatment of osteoporosis for many people; on average, just under half (49%) of those eligible engage with an FLS.⁸

Supporting quality of life as part of healthy and active ageing: prevention of falls and fractures in later life

Effective falls prevention programmes are widely established, although access may vary across the country. The Dutch population is ageing rapidly, leading to a drastic increase in deaths from falls in recent years.¹² To address this problem, a number of falls prevention programmes have been developed and are now officially recommended by the government.¹³ These programmes, designed for adults aged 55 or over, involve educational components and activities to improve mobility and balance or to increase awareness of falls risk.¹³ Falling Past Time (Vallen Verleden Tijd) is a particularly effective programme, which has led to a 46% reduction in falls.¹⁴ However, access may vary as falls prevention programmes generally must be financed by individual municipalities or through insurance policies.¹⁵

Engaging patients and public: awareness, activation and self-management

Public awareness activities are primarily implemented by patient associations in the Netherlands. The Osteoporosis Association (Osteoporose Vereniging) is a volunteer-operated patient organisation which aims to support people with osteoporosis and promote prevention through its 'Strong Bones Platform'.¹⁶ This initiative focuses on improving bone health through exercise and good nutrition.¹⁷ For people who have already been diagnosed with osteoporosis, extensive information and various resources are available on the Osteoporosis Association website.

The rate of people consistently taking osteoporosis medication is low, and there are few strategies in place to promote self-management. Fewer than half of people who have been prescribed osteoporosis medication continue to take it for one year.¹⁸ Post-fracture follow-up is usually limited, with responsibility for ongoing management falling to primary care, where the management of osteoporosis is generally not prioritised. As a result, people with osteoporosis may not be adequately supported to keep taking their medication.³

References

1. Svedbom A, Hernlund E, Ivergard M, *et al.* 2013. Osteoporosis in the European Union: a compendium of country-specific reports. *Arch Osteoporos* 8: 137
2. Ministry of Health Welfare and Sport. 2019. *The national prevention agreement: A healthier Netherlands*. The Hague: Ministry of Health Welfare and Sport
3. Hilgsmann M. 2019. Interview with Taylor Morris and Jody Tate at The Health Policy Partnership [telephone]. 12/08/19
4. Voeten SC, Arends AJ, Wouters MWJM, *et al.* 2019. The Dutch Hip Fracture Audit: evaluation of the quality of multidisciplinary hip fracture care in the Netherlands. *Arch Osteoporos* 14(1): 28
5. Dutch Institute for Clinical Auditing. 2019. *Annual report 2018: DHFA*. Leiden: DICA
6. Ministry of Health Welfare and Sport. 2018. *Healthcare in the Netherlands*. The Hague: Ministry of Health Welfare and Sport
7. Nederlands Huisartsen Genootschap. 2012. *NHG-Standaard Fractuurpreventie*. Utrecht: Nederlands Huisartsen Genootschap
8. van den Berg P, Schweitzer DH, van Haard PM, *et al.* 2015. Meeting international standards of secondary fracture prevention: a survey on Fracture Liaison Services in the Netherlands. *Osteoporos Int* 26(9): 2257-63
9. Dunnewind T, Dvortsin EP, Smeets HM, *et al.* 2017. Economic Consequences and Potentially Preventable Costs Related to Osteoporosis in the Netherlands. *Value Health* 20(6): 762-68
10. Federatie Medisch Specialisten. 2016. *Proximale femurfractuur - organisatie van zorg bij de behandeling van kwetsbare ouderen rondom chirurgische ingrepen*. Utrecht: Federatie Medisch Specialisten
11. Huntjens KM, van Geel TA, Blonk MC, *et al.* 2011. Implementation of osteoporosis guidelines: a survey of five large fracture liaison services in the Netherlands. *Osteoporos Int* 22(7): 2129-35
12. Schuetze CF. 2018. Afraid of falling? For older adults, the Dutch have a cure [online]. *The New York Times*. Available from: <https://www.nytimes.com/2018/01/02/world/europe/netherlands-falling-elderly.html> [Accessed 30/09/19]
13. National Institute for Public Health and the Environment. Interventieoverzicht Valpreventie. Available from: <https://interventies.loketgezondleven.nl/interventieoverzicht2/Valpreventie> [Accessed 01/10/19]
14. Weerdesteyn V, Rijken H, Geurts ACH, *et al.* 2006. A Five-Week Exercise Program Can Reduce Falls and Improve Obstacle Avoidance in the Elderly. *Gerontology* 52(3): 131-41
15. Veiligheid NL. Voorbeelden om aan de slag te gaan met Valpreventie. Available from: <https://www.veiligheid.nl/valpreventie/financieringsmogelijkheden-valpreventie-initiatieven/voorbeelden> [Accessed 01/10/19]
16. Osteoporose Vereniging. Activiteiten van de vereniging. Available from: <https://osteoporosevereniging.nl/vereniging/activiteiten/> [Accessed 11/09/19]
17. Sterke botten. Platform sterke botten. Available from: <https://sterkebotten.nu/> [Accessed 11/09/19]
18. Netelenbos JC, Geusens PP, Ypma G, *et al.* 2011. Adherence and profile of non-persistence in patients treated for osteoporosis—a large-scale, long-term retrospective study in The Netherlands. *Osteoporos Int* 22(5): 1537-46

Osteoporosis and fragility fracture prevention in Romania



Osteoporosis and fragility fractures do not appear to be prioritised at a policy level in Romania. While national guidance for managing osteoporosis has been published and treatment is fully reimbursed, there do not appear to be programmes in place to support delivery of best-practice prevention or treatment of osteoporosis and fragility fractures.

Burden and impact of osteoporosis and fragility fractures

Osteoporosis and fragility fractures impose a considerable burden on the health system in Romania. Approximately 20.5% of women and 6.2% of men aged 50 and over in Romania are estimated to have osteoporosis.¹ This contributes to over 94,000 fragility fractures each year,¹ of which nearly 15,000 are hip fractures.² When last estimated in 2010, osteoporosis incurred healthcare costs of €129 million, and costs are expected to reach €151 million by 2025.¹

Building a system that works: policies for scrutiny, accountability and investment

Osteoporosis and fragility fractures have received some national attention in Romania, but are not currently prioritised in policy. The National Health Insurance House (Casa Națională de Asigurări de Sănătate) operates 15 specific health programmes,³ including the national endocrine disease programme, which provides osteoporosis treatment free of charge for people who have been diagnosed.⁴ The national government also published guidance for the diagnosis and treatment of postmenopausal osteoporosis in 2010.⁵ However, osteoporosis is not included as a priority disease in the national health strategy for 2014–2020, which identifies a range of priority areas for prevention and treatment of chronic diseases.⁶ An expert interviewed for this country profile reported that prioritisation and funding of osteoporosis programmes has declined over the last decade, leading to a reduction in treatment.⁷

National healthcare data, including data on osteoporosis and fragility fractures, are routinely collected in Romania – but these data are not always used to support service improvement. Information systems for healthcare data are established in Romania and are managed by national bodies⁸ such as the National Health Insurance House, which collects extensive data on healthcare provision⁹ including diagnosis and treatment of osteoporosis.⁷ The national hospital discharge register is also used to collect data on all hospital admissions, including admissions for hip fractures, but there is no dedicated registry for osteoporosis or fragility fractures.^{2,7} There are some recognised limitations with existing healthcare databases

in Romania, such as incomplete and duplicate data, and little information is made available to the public.⁸ Furthermore, the data are not frequently analysed or used to inform healthcare service delivery.⁸

Reimbursement policy in Romania supports access to osteoporosis treatment, although there may be some barriers to diagnosis.^{5,8} The national endocrine disease programme provides reimbursement for dual-energy X-ray absorptiometry (DXA) scanning to investigate osteoporosis, and for free treatment for people diagnosed with osteoporosis.^{7,8} Through this programme, over 5,000 people with osteoporosis are treated each year.^{4,7} However, DXA scanning may be restricted due to the small number of DXA machines in the country,¹⁰ and treatment is usually only provided for people who have been diagnosed with osteoporosis through DXA scan or for those who have already had a fragility fracture.⁵ This means some people at high risk may not receive appropriate treatment before a fracture occurs if they do not have access to a DXA scan.^{10,11}

Catching it early: detection and management in primary care

Primary care providers are often involved in identification of fracture risk, but there may be gaps in service delivery. National guidance states that people at risk of osteoporosis should usually be identified in primary care,⁵ and awareness of osteoporosis risk seems to be high among primary care providers.⁷ This can be supported by the use of a country-specific Fracture Risk Assessment Tool (FRAX®),² which is used by both primary care providers and specialists.⁷ However, diagnosis of osteoporosis and prescription of treatment are usually carried out in a hospital setting by a specialist who is responsible for the person's ongoing osteoporosis management.⁷ Indeed, provision of services through primary care is an ongoing challenge in Romania as healthcare is disproportionately delivered in specialist or inpatient settings, with primary care reportedly being underutilised.⁸

“As an endocrinologist, I can see that osteoporosis has not been a priority for policymakers over the last 10 years. As a result, support for the osteoporosis programme has declined, leading to a reduction in the number of treatments that are reimbursed and in the number of people who receive treatment.”

DIANA PĂUN,
NATIONAL INSTITUTE OF
ENDOCRINOLOGY CI PARHON

Getting people back on track: facilitating multidisciplinary post-discharge care

Clinical guidance for post-fracture care is available, but there appears to be limited support for dedicated multidisciplinary services. Clinical guidance has been developed for prevention and treatment of osteoporosis⁵ and for the treatment of hip fractures.¹² Post-fracture guidance, published by the Romanian Society of Orthopaedics and Traumatology (Societatea Romana de Ortopedie si Traumatologie; SOROT), is primarily focused on surgical treatment, although multidisciplinary working and early post-surgery mobilisation are discussed.¹² However, there are few details about which specialists should be involved in multidisciplinary teams or how services should be organised.¹² While it does not appear in clinical guidance, conducting surgery within 48 hours of admission is occasionally referenced as a target.¹³ For example, in a performance audit of 10 Romanian hospitals, two hospitals reported that 100% of older patients with a hip fracture received surgical intervention within 48 hours of admission.¹⁴ More than 5% of people with hip fractures die in hospital in Romania,¹⁵ but data on other outcomes do not appear to be available.

Post-fracture follow-up and care appear to be underdeveloped in Romania. Following a fragility fracture, people are not always prescribed medication.¹⁶ When last assessed in 2010, only 6% of men and 17% of women who were eligible for treatment were taking it,¹ representing one of the largest treatment gaps of any country in the European Union.¹⁶ This may be due, in part, to the fact that surgical treatment of fractures is separate from investigation for osteoporosis, which is usually initiated in primary care and then carried out by a specialist such as an endocrinologist.⁷ Furthermore, there do not appear to be formal programmes in place for post-fracture follow-up care and Romania does not have any fracture liaison services registered with Capture the Fracture®.¹⁷

Supporting quality of life as part of healthy and active ageing: prevention of falls and fractures in later life

Falls are a significant cause of disability, but national strategies do not appear to address falls among older people. In Romania, falls are the second leading cause of disability, after lower back pain.¹⁸ Despite this, the national strategy for active ageing, published by the Ministry of Labour and Social Protection, does not discuss falls prevention as a priority area.¹⁹ While the Association for Prevention of Osteoporosis in Romania (ASPOR) highlights falls prevention as an important component of fracture prevention,²⁰ there do not appear to be strategies or programmes in place to prevent falls in the older population.

Engaging patients and public: awareness, activation and self-management

Some public awareness campaigns have been implemented by civil society,²¹ resulting in reportedly high levels of awareness.⁷ ASPOR is active in promoting awareness of osteoporosis among both clinicians and the public.²¹ For example, it publishes an educational magazine for members, organises public campaigns and operates symposia and training courses.²¹ SROBMS is a professional society that also engages in public awareness activities, as well as running annual symposia and offering professional training courses.²² As a result of a range of effective public awareness activities, people at risk of osteoporosis seem to be aware of this risk and proactive in seeking diagnosis and treatment.⁷ However, there do not appear to be national data available on public awareness or use of osteoporosis medication.

References

1. Svedbom A, Hernlund E, Ivergard M, *et al.* 2013. Osteoporosis in the European Union: a compendium of country-specific reports. *Arch Osteoporos* 8: 137
2. Grigorie D, Sucaliuc A, Johansson H, *et al.* 2013. Incidence of hip fracture in Romania and the development of a Romanian FRAX model. *Calcif Tissue Int* 92(5): 429-36
3. Casa Națională de Asigurări de Sănătate. Lista Programelor Naționale de Sănătate. [Updated 31/05/14]. Available from: <http://www.cnas.ro/page-2/category/lista-programelor-nationale-de-sanatate.html> [Accessed 20/11/19]
4. Casa Națională de Asigurări de Sănătate. Programul național de boli endocrine. Available from: <http://www.cnas.ro/page/programul-national-de-boli-endocrine.html> [Accessed 20/11/19]
5. Ghid de practică medicală pentru specialitatea endocrinologie: ghid pentru diagnosticul si tratamentul osteoporozei de postmenopauza. 2010. Romania: 18/10/10
6. Strategia Nationala din 18 noiembrie 2014: de sănătate 2014-2020. 2014. Romania: 18/11/19
7. Păun D. 2019. Interview with Taylor Morris at The Health Policy Partnership [Telephone]. 11/12/19
8. Vladescu C, Scintee SG, Olsavszky V, *et al.* 2016. *Romania: health system review*. Brussels: European Observatory on Health Systems and Policies
9. Casa Națională de Asigurări de Sănătate. Protecția datelor cu caracter personal. Available from: <http://www.cnas.ro/page/protectia-datelor-cu-caracter-personal-3.html> [Accessed 11/12/19]
10. Kanis J, Hernlund E, Svedbom A, *et al.* 2013. The osteoporosis treatment gap in Romania. *Acta Endocrinol (Buchar)* 9(4): 509-14
11. Grigorie D, Sucaliuc A, Johansson H, *et al.* 2013. FRAX-based intervention and assessment thresholds for osteoporosis in Romania. *Arch Osteoporos* 8: 164
12. Lupescu O, Roman MD, Deleanu B, *et al.* 2018. Guidance and Guideline-recommendations for the treatment of femoral neck fractures Romanian Society of Orthopaedics and Traumatology- SOROT 2018. *Romanian Journal of Orthopaedic Surgery and Traumatology* 1(2): 101
13. Georgescu NM. Fracture osteoporotice. Available from: <https://providentamedical.ro/fracturile-osteoporotice/fracturile-osteoporotice> [Accessed 25/11/19]
14. Oxford Policy Management. 2017. *Performance auditing of selected public hospitals with arrears*. Bucharest: Ministerul Sanatatii
15. Dobre R, Niculescu D, Popescu G, *et al.* 2019. In-hospital mortality rate after osteoporotic hip fracture in Bucharest. *Romanian Journal of Orthopaedic Surgery and Traumatology* 2(1): 48-51
16. Hernlund E, Svedbom A, Ivergard M, *et al.* 2013. Osteoporosis in the European Union: medical management, epidemiology and economic burden. A report prepared in collaboration with the International Osteoporosis Foundation (IOF) and the European Federation of Pharmaceutical Industry Associations (EFPIA). *Arch Osteoporos* 8: 136
17. Capture the Fracture. Map of best practice. Available from: https://www.capturethefracture.org/map-of-best-practice?field_rating_tid=All&country=ro [Accessed 22/11/19]
18. Institute for Health Metrics and Evaluation. Romania. Available from: <http://www.healthdata.org/romania> [Accessed 05/12/19]
19. Ministerul Muncii și Protecției Sociale. 2015. *Strategia națională pentru promovarea îmbătrânirii active și protecția persoanelor vârstnice 2015-2020*. Bucharest: Ministerul Muncii și Protecției Sociale
20. Association for the Prevention of Osteoporosis in Romania. Osteoporoza. Available from: https://www.aspor.ro/index.php?option=com_content&view=article&id=13:osteoporoza&catid=31&showall=1&Itemid=44 [Accessed 21/11/19]
21. Association for the Prevention of Osteoporosis in Romania. Association for the Prevention of Osteoporosis in Romania - ASPOR. Available from: https://www.aspor.ro/index.php?option=com_content&view=article&id=12&Itemid=141 [Accessed 21/11/19]
22. Societatea Romana de Osteoporoza si Boli Musculoscheletice. Despre noi. Available from: <http://www.srobms.ro/despre-noi.html> [Accessed 05/12/19]

Osteoporosis and fragility fracture prevention in Spain



While osteoporosis has received some policy attention in Spain, a lack of strategic recommendations, investment and detailed national guidance has led to barriers in access to care and significant variation in clinical practice. However, civil society and clinicians across the country are active in improving fragility fracture prevention through implementing a national hip fracture audit and promoting multidisciplinary post-fracture care, which is well-established in Spain.

Burden and impact of osteoporosis and fragility fractures

The burden of osteoporosis and fragility fractures in Spain is high and rising. The number of people living with osteoporosis and experiencing fragility fractures is comparable to other EU countries, and is expected to rise rapidly.¹ In Spain, 22.5% of women and 6.8% of men over 50 have osteoporosis, contributing to around 330,000 fragility fractures per year.¹ As the population ages, the number of fragility fractures is expected to increase to 420,000 in 2030, with an expected rise in associated healthcare costs from €4.2 billion in 2017 to €5.5 billion in 2030.¹

Building a system that works: policies for scrutiny, accountability and investment

Osteoporosis is addressed in some national health strategies in Spain, but specific plans for reducing fragility fracture risk are lacking. Both the strategy for health promotion and prevention² and the strategy on rheumatic and musculoskeletal diseases³ address the need to reduce the risk of osteoporosis. However, these documents provide few specific recommendations to support fragility fracture prevention.

The Spanish National Hip Fracture Registry (Registro Nacional de Fractura de Cadera; RNFC) has been established, but national investment is needed to secure its future.

Initiated in 2016 by a network of clinicians across Spain, the RNFC collects data on people over 75 who present to hospital with a hip fracture and follows them up for 30 days after they are discharged.⁴ The data collected align with the Fragility Fracture Network Minimum Common Dataset and can be used for national and international assessment of hospital performance in hip fracture care.⁵ The registry is currently funded through industry donations and research grants, but national funding has been identified by experts as a priority to ensure its sustainability.⁵

Changes to reimbursement policy in the past decade have introduced a barrier to people taking osteoporosis treatment. In 2012, cost-sharing for prescription medications was revised as part of wider austerity measures. This introduced a co-payment for older people, who were previously exempt from paying for prescriptions, and raised the existing co-payment for the working population.⁶ This change in policy has been associated with a decline in use of osteoporosis medication.⁶

Catching it early: detection and management in primary care

Clinical guidance is limited, leading to nationwide variations in diagnosis and management of osteoporosis in primary care. While national guidelines discuss the use of both clinical risk factors and bone mineral density testing to diagnose osteoporosis,⁷ there is no consensus on which risk assessment tool or criteria should be used to initiate treatment.⁸ As a result, risk factors are often not recognised and people are rarely referred for further investigation.⁸ In addition, osteoporosis medication is frequently either over- or under-prescribed in primary care,⁹ and experts have called for national and international guidelines to support appropriate management.¹⁰

Getting people back on track: facilitating multidisciplinary post-fracture care

While orthogeriatric services are common in Spain, delivery of internationally recognised best-practice standards for in-hospital hip fracture care varies considerably.⁴ Results from the first year of the RNFC showed that most patients (94%) were seen by key specialists such as orthogeriatricians in addition to the orthopaedic surgeon.^{4,5} However, fewer than half had surgery within 48 hours of admission.¹¹ Initiation of osteoporosis medication in hospital was higher than in many other countries at around 40%,⁴ but varied between hospitals – ranging from 0% to 94%.⁵ Similar variation was noted in the proportion of patients who were mobile the day after surgery, which ranged from 0% in some hospitals to 97% in others.⁵

Implementation of fracture liaison services (FLS) is well-established in Spain.

The Spanish Society for Bone Research (Sociedad Española de Investigación Ósea y del Metabolismo Mineral; SEIOMM) is active in promoting the establishment of FLS across the country, and the number of FLS in Spain is among the highest of any country in the world.¹ This includes 64 services that have been evaluated through the Capture the Fracture[®] programme, 13 of which have received a gold rating.¹²

Supporting quality of life as part of healthy and active ageing: prevention of falls and fractures in later life

Falls are a major problem for older people in Spain, both in the community¹³ and in care homes.¹⁴ Falls in care homes are relatively common – sometimes leading to fractures – and are most often prevented by restraining movement; however, restraint is associated with a greater occurrence of injuries from falls.¹⁴ In the whole population, the number of deaths resulting from falls has significantly increased in older men and women, leading experts to call for comprehensive falls prevention programmes.^{13,15}

Engaging patients and public: awareness, activation and self-management

Civil society organisations in Spain are active in raising awareness about osteoporosis and fragility fracture prevention. Various organisations such as the Spanish Association for Osteoporosis and Arthritis (Asociación Española con la Osteoporosis y la Artrosis; AECOSAR),¹⁶ Hispanic Foundation for Osteoporosis and Metabolic Bone Disease (Fundación Hispana de Osteoporosis y Enfermedades Metabólicas Oseas; FHOEMO)¹⁷ and SEIOMM¹⁸ produce educational materials and run public awareness campaigns. In 2018, they collaborated to launch a campaign that aimed to raise public awareness of the consequences of osteoporosis and activate the medical community to engage with fracture prevention. The campaign, called Your Bones. Tomorrow and Always (Tus Huesos. Mañana y siempre), was built around a short film telling the story of a woman with osteoporosis.¹⁹



Tomorrow and Always (Mañana y Siempre), Spain

While osteoporosis medication use was previously high in Spain, self-management with osteoporosis treatment has significantly declined. In 2010, the use of osteoporosis medication was among the highest in the world, with around 28% of women over 50 taking it. By 2015, however, based on data from the Valencia region, use had declined by about half; this has been attributed both to safety warnings and the revised co-payment policy mentioned above.⁶

References

1. International Osteoporosis Foundation. 2018. *Broken bones, broken lives: A roadmap to solve the fragility fracture crisis in Spain*. Nyon: IOF
2. Ministerio de Sanidad Servicios Sociales e Igualdad. 2014. *Estrategia de promoción de la salud y prevención en el SNS*. Madrid: Ministerio de Sanidad Servicios Sociales e Igualdad
3. Ministerio de Sanidad Servicios Sociales e Igualdad. 2013. *Estrategia en enfermedades reumáticas y musculoesqueléticas del Sistema Nacional de Salud*. Madrid: Ministerio de Sanidad Servicios Sociales e Igualdad
4. Ojeda-Thies C, Sáez-López P, Currie CT, et al. 2019. Spanish National Hip Fracture Registry (RNFC): analysis of its first annual report and international comparison with other established registries. *Osteoporos Int* 30(6): 1243-54
5. Registro Nacional de Fracturas de Cadera. 2018. *Registro nacional de fracturas de cadera por fragilidad: Informe anual 2017*. Madrid: RNFC
6. Hurtado-Navarro I, Garcia-Sempere A, Rodriguez-Bernal C, et al. 2019. Impact of Drug Safety Warnings and Cost-Sharing Policies on Osteoporosis Drug Utilization in Spain: A Major Reduction But With the Persistence of Over and Underuse. Data From the ESOSVAL Cohort From 2009 to 2015. *Front Pharmacol* 10: 768
7. Grupo de trabajo de la Guía de Práctica Clínica sobre Osteoporosis y Prevención de Fracturas por Fragilidad. 2010. *Guía de práctica clínica sobre osteoporosis y prevención de fracturas por fragilidad*. Madrid: Agència d'Informació, Avaluació i Qualitat en Salut (AIAQS) de Catalunya
8. Martínez-Laguna D. 2018. Osteoporosis y Atención Primaria. Como valorar el riesgo de fractura. Utilización de las escalas de riesgo. *Revista de Osteoporosis y Metabolismo Mineral* 10(1): Supplement: 5-8
9. Abella CC. 2011. La osteoporosis en Atención Primaria. *Revista de Osteoporosis y Metabolismo Mineral* 3(2): 73-74
10. Sanfélix-Gimeno G, Hurtado I, Sanfélix-Genovés J, et al. 2015. Overuse and underuse of antiosteoporotic treatments according to highly influential osteoporosis guidelines: a population-based cross-sectional study in Spain. *PLoS One* 10(8): e0135475
11. Ministerio de Sanidad Servicios Sociales e Igualdad. 2018. *Actividad y calidad de los servicios sanitarios: Informe anual del sistema nacional de salud 2017*. Madrid: Ministerio de Sanidad Consumo y Bienestar Social
12. International Osteoporosis Foundation. 2019. Capture the Fracture. Map of best practice. Available from: https://www.capturethefracture.org/map-of-best-practice-page?field_rating_tid=All&country=de [Accessed 30/08/19]
13. Rodríguez-Molinero A, Narvaiza L, Gálvez-Barrón C, et al. 2015. Caídas en la población anciana española: incidencia, consecuencias y factores de riesgo. *Rev Esp Geriatr Gerontol* 50(6): 274-80
14. Aranda-Gallardo M, Morales-Asencio JM, Enriquez de Luna-Rodríguez M, et al. 2018. Characteristics, consequences and prevention of falls in institutionalised older adults in the province of Malaga (Spain): a prospective, cohort, multicentre study. *BMJ Open* 8(2): e020039
15. Padrón-Monedero A, Damián J, Pilar Martín M, et al. 2017. Mortality trends for accidental falls in older people in Spain, 2000-2015. *BMC Geriatr* 17(1): 276
16. Asocacion espanola con la osteoporosis y la artrosis. Objetivos estrategicos. Available from: <http://www.aecosar.es/objetivos-estrategicos/> [Accessed 07/08/19]
17. Fundacion Hispana de Osteoporosis y Enfermedades Metabolicas Oseas. Quienes Somos. Available from: <https://fhoemo.com/quienes-somos/> [Accessed 06/09/19]
18. Sociedad Espanola de Investigacion Osea y del Metabolismo Mineral. Quienes somos. Available from: <https://seiommm.org/quienes-somos/> [Accessed 06/09/19]
19. Fundacion Hispana de Osteoporosis y Enfermedades Metabolicas Oseas. 2018. *Tus Huesos Manana y Siempre*. Madrid: FHOEMO

Osteoporosis and fragility fracture prevention in the United Kingdom



Osteoporosis and fragility fractures are prioritised at the policy level in England, Northern Ireland, Scotland and Wales, supporting the development of a range of programmes to support best-practice care and prevention of fragility fractures. National audit data show that performance against quality standards is improving every year, although gaps remain in access to key services.

Burden and impact of osteoporosis and fragility fractures

Osteoporosis and fragility fractures affect a significant number of people. In the UK, 21.8% of women and 6.8% of men over 50 are living with osteoporosis, leaving them at significant risk of a potentially life-changing or even fatal fragility fracture.¹ In 2017 alone, there were more than half a million (520,000) fragility fractures in the UK.¹

Fragility fractures put considerable pressure on the UK's health systems. People who have sustained a hip fracture occupy 1 in 45 hospital beds in England and Northern Ireland and 1 in 33 hospital beds in Wales.² This contributed to over £4.5 billion in total costs for osteoporosis in 2017, and costs are projected to increase to nearly £6 billion by 2030.¹

Building a system that works: policies for scrutiny, accountability and investment

Fragility fracture prevention is recognised as a key area for action and features in national health strategies and guidance. In England, Wales and Scotland, fragility fractures seem to be prioritised at a policy level.³ For example, Public Health England's strategic framework for musculoskeletal health discusses the impact of osteoporosis and the importance of both prevention and management of fragility fractures.⁴ In Northern Ireland, however, there seems to be less policy focus on fragility fracture prevention, and expert commentators have noted that improvements in care appear to be largely driven by national societies and clinicians.^{3,5}

The UK is spearheading the collection and use of data on bone fracture prevention and management, contributing to improved health outcomes. In England and Wales, the National Hip Fracture Database (NHFD) is used to audit hip fracture care and activities

to prevent subsequent fractures.⁶ In Scotland, the Scottish Hip Fracture Audit (SHFA) aims to collect data on all hip fracture patients admitted to hospital who are aged 50 or over.⁷ Implementation of these databases has contributed to improvements in patient outcomes, including the number of people who die within 30 days of a hip fracture and the average length of stay in hospital.^{6,7} Another pioneering audit tool is the Fracture Liaison Service Database, which is the only national audit of fracture prevention services in the world that collects patient-level data to assess the care people receive after a fracture.⁸

Reimbursement policies support access to osteoporosis medication. Osteoporosis medications are fully reimbursed, resulting in good access for people in the UK.

Catching it early: detection and management in primary care

While considerable effort has been made to encourage better detection and management of osteoporosis in primary care, notable gaps remain. Detailed national guidance supports healthcare professionals in fracture risk assessment and management in primary care.^{10,11} Comprehensive educational materials for general practitioners (GPs) and practice nurses have been developed through collaborative efforts between the Royal Osteoporosis Society (ROS) and Royal College of General Practitioners, and are available online.¹² The implementation of available guidance is patchy, however, and recent data show that only 7.6% of people are taking osteoporosis treatment before a hip fracture occurs.¹³ This represents a small decline in treatment since 2016.¹³

Primary care practitioners are incentivised to identify patients at risk of fracture, but impact on patient outcomes appears to be limited. In England, Wales and Northern Ireland, the Quality and Outcomes Framework (QOF) is a voluntary incentive scheme that pays GPs for meeting specific standards of care.^{14,15} Osteoporosis-related indicators include primary care practices maintaining a register of patients who have sustained a fragility fracture or been diagnosed with osteoporosis.¹⁵ However, evidence suggests the use of osteoporosis-related QOF indicators has had little effect on patient outcomes.¹⁶ In addition, the number of QOF points that can be gained by managing osteoporosis has recently been reduced, further limiting the scheme's impact and possibly indicating the deprioritisation of osteoporosis.¹⁷

Case study

Fracture Liaison Service Database, UK

Implementation of the Fracture Liaison Service Database has been transformative – we now have a framework for getting it right.'

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Getting people back on track: facilitating multidisciplinary post-fracture care

Case study

Hip fracture best practice tariff, England, UK

A national audit and hospital incentives have contributed to improved outcomes for hip fracture patients.¹⁸ In-hospital management of hip fractures has seen annual improvements, leading to better outcomes such as consistently declining rates of death within a month of the fracture.¹³ In England, hospitals receive a best practice tariff (BPT) if they meet eight best-practice standards when managing a person with a hip fracture.² A similar scheme is being implemented in Scotland.⁷ Care that meets these standards is associated with significantly improved patient outcomes^{19,20} and, in order to achieve them, many hospitals have adopted integrated orthogeriatric models of care.¹⁸ In contrast, best-practice care standards are reached far less frequently in Wales and Northern Ireland, where such tariffs are not in place.¹³ However, there is still considerable variation between hospitals across England in achievement of key BPT standards such as orthogeriatric assessment, which ranges from 1 to 100% of hip fractures.¹³ While the BPT has certainly had an impact, some experts argue that the development of the NHFD has in fact been the primary driver of improved management of hip fractures in hospitals.^{3,21}

Fracture liaison services (FLS) are well-established in the UK, although there is wide variation in access. Since FLS were first developed in Scotland,²² implementation has expanded across the UK and it is estimated that 55% of the UK population now has access to an FLS.¹ While this is higher than in many other European countries, thousands of people still lack access.²³ FLS are unevenly distributed across the UK, with better coverage in some areas than others.^{3,8} Every health board in Scotland, for example, operates an FLS.²⁴ In England, there is notable variation, with experts identifying a range of barriers to implementation including limited funding, staff capacity and variations in commissioning decisions at a local level.⁵ It has also been suggested that local champions are instrumental in pushing for investment in new services.³

FLS programmes in the UK are supporting improved identification and management of osteoporosis, although challenges remain. While there are some gaps in service provision and reporting, annual audit data show continuous improvement. In 2017, identification of fragility fractures increased from 40% to 43%.⁸ While osteoporosis

medication was recommended to 43% of people seen by an FLS – up from 38% the previous year – only 38% of these people had their medication monitored by a healthcare professional during follow-up.⁸ To improve prevention of subsequent fractures, an expert commentator has stated that optimisation of existing FLS should be prioritised so that examples of best practice can be used to inform the implementation of additional FLS across the UK.³

Limited integration of services may pose a barrier to long-term follow-up and treatment review. Clinical guidance states that osteoporosis treatment should be reviewed 16 weeks after initiation and annually thereafter.²⁵ While treatment is generally initiated by a specialist or through an FLS, long-term monitoring and management must usually be facilitated in primary care.^{5,25} However, communication gaps and suboptimal collaboration between secondary and primary care can mean that treatment plans are not adequately monitored and people may not be supported to adhere to treatment in the long term.⁵

Supporting quality of life as part of healthy and active ageing: prevention of falls and fractures in later life

National guidance and programmes across the UK support health and social care professionals to prevent falls and fractures. Government and healthcare organisations in both England and Scotland have published guidance and resources that aim to reduce falls and fractures in both clinical and community settings.^{26,27} For example, NHS Scotland developed the good practice resource, *Managing falls and fractures in care homes for older people*.²⁸ In the care homes where these resources were used, outcomes significantly improved and in some cases falls were reduced by over 30%.²⁹ In addition, a multidisciplinary civil society initiative, the Housing and Ageing Alliance, has been established to promote improvements in housing for older people across the UK so that they can maintain their independence and quality of life for longer. The Alliance's manifesto, published in 2019, calls for integration of health and social care services, and investment in home adaptations and specialist housing, to prevent or delay the need for more intensive care.³⁰

Engaging patients and public: awareness, activation and self-management

Public awareness campaigns are driven by national organisations, but more work is needed to ensure people are aware of osteoporosis and empowered to access care.³ The ROS is a UK-wide charity that aims to improve bone health and prevent osteoporosis in the population.³¹ In addition to producing materials such as posters and leaflets, it encourages people with osteoporosis to get involved in awareness-raising activities.³¹ However, experts report that many people remain unaware of osteoporosis and the associated fracture risk.^{3,5}

Self-management of osteoporosis is a challenge in the UK and, as in many countries, the proportion of people continuing to take osteoporosis medication is low. In 2017, only 19% of people who had been prescribed osteoporosis medication were still taking it 12 months later.⁸ Reasons may include adverse side effects,³² inconvenience and people not understanding the importance of staying on treatment.³³ In addition, experts have called for improved communication between FLS and primary care to ensure that people who have started treatment are followed-up and supported to keep taking their medication in the long term.⁵



If there aren't really good connections made between a fracture liaison service and primary care providers, follow-up can be less effective and people can fall through the gaps.

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References

1. International Osteoporosis Foundation. 2018. *Broken bones, broken lives: A roadmap to solve the fragility fracture crisis in the United Kingdom*. Nyon: IOF
2. Royal College of Physicians. 2018. *National Hip Fracture Database annual report 2018*. London: RCP
3. Javaid K. 2019. Interview with Taylor Morris at The Health Policy Partnership [telephone]. 13/09/19
4. Ali N, Qadery S, Narle G. 2019. *Musculoskeletal Health: 5 year strategic framework for prevention across the lifecourse*. London: PHE publications
5. Thurston A. 2019. Interview with Kirsten Budig at The Health Policy Partnership [telephone]. 13/09/19
6. Neuburger J, Currie C, Wakeman R, et al. 2015. The impact of a national clinician-led audit initiative on care and mortality after hip fracture in England: an external evaluation using time trends in non-audit data. *Med Care* 53(8): 686-91
7. NHS National Services Scotland. 2018. *Scottish Hip Fracture Audit: Hip fracture care pathway report 2018*. Edinburgh: NHS National Services Scotland
8. Royal College of Physicians. 2018. *Fracture Liaison Service Database annual report: Achieving effective service delivery by fracture liaison services*. London: RCP
9. Kanis JA, Borgstrom F, Compston J, et al. 2013. SCOPE: a scorecard for osteoporosis in Europe. *Arch Osteoporos* 8: 144
10. National Institute for Health and Care Excellence. 2017. *Osteoporosis: assessing the risk of fragility fracture*. London: NICE
11. Scottish Intercollegiate Guidelines Network (SIGN). 2015. *Management of osteoporosis and the prevention of fragility fractures*. Edinburgh: SIGN
12. Royal Osteoporosis Society. Osteoporosis resources for primary care. [Updated 2017]. Available from: <https://theros.org.uk/healthcare-professionals/courses-and-cpd/osteoporosis-resources-for-primary-care/> [Accessed 30/08/19]
13. Royal College of Physicians. 2019. *National Hip Fracture Database annual report 2019*. London: RCP
14. British Medical Association. 2019. *The Quality and Outcomes Framework (QOF)*. London: BMA
15. Primary Care Strategy and NHS Contracts Group. 2019. *2019/20 General Medical Services (GMS) contract Quality and Outcomes Framework (QOF)*. London: NHS England
16. Forbes LJ, Marchand C, Doran T, et al. 2017. The role of the Quality and Outcomes Framework in the care of long-term conditions: a systematic review. *Br J Gen Pract* 67(664): e775-e84
17. Royal Osteoporosis Society. Reduction in QOFs will impact osteoporosis detection and treatment. [Updated 10/02/19]. Available from: <https://theros.org.uk/what-we-do/media-centre/press-releases/reduction-in-qofs-will-impact-osteoporosis-detection-and-treatment/> [Accessed 30/09/19]
18. Middleton M. 2018. Orthogeriatrics and Hip Fracture Care in the UK: Factors Driving Change to More Integrated Models of Care. *Geriatrics (Basel)* 3(3): 10.3390/geriatrics3030055
19. Oakley B, Nightingale J, Moran CG, et al. 2017. Does achieving the best practice tariff improve outcomes in hip fracture patients? An observational cohort study. *BMJ Open* 7(2): e014190-e90
20. Farrow L, Hall A, Wood AD, et al. 2018. Quality of Care in Hip Fracture Patients: The Relationship Between Adherence to National Standards and Improved Outcomes. *J Bone Joint Surg Am* 100(9): 751-57
21. Mitchell P. Interview with The Health Policy Partnership [In person]. 29/08/19
22. McLellan AR, Gallacher SJ, Fraser M, et al. 2003. The fracture liaison service: success of a program for the evaluation and management of patients with osteoporotic fracture. *Osteoporos Int* 14(12): 1028-34
23. National Osteoporosis Society. 2015. *Effective Secondary Prevention of Fragility Fractures: Clinical Standards for Fracture Liaison Services*. Bath: NOS
24. Royal Osteoporosis Society. Scotland becomes second country in the world to have 100% fracture liaison service as Royal Osteoporosis Society launches new clinical standards for fracture liaison service. Available from: <https://theros.org.uk/what-we-do/media-centre/press-releases/scotland-becomes-second-country-in-world-to-have-100-fracture-liaison-service-as-royal-osteoporosis-society-launches-new-clinical-standards-for-fracture-liaison-service/> [Accessed 15/11/19]
25. National Osteoporosis Society. 2017. *Quality standards for osteoporosis and prevention of fragility fractures*. Bath: National Osteoporosis Society
26. Public Health England. 2019. *Falls: applying All Our Health*. London: PHE
27. MacIntyre D, National Falls Prevention Coordination Group. 2017. *Falls and fracture consensus statement: Supporting commissioning for prevention*. London: PHE
28. NHS Scotland. 2011. *Managing falls and fractures in care homes for older people: Good practice self assessment resource*. Aberdeen: Social Care and Social Work Improvement Scotland
29. Cooper R. 2017. Reducing falls in a care home. *BMJ Qual Improv Rep* 6(1): u214186.w5626
30. The Housing and Ageing Alliance. 2019. *Time for Action*. London: Housing LIN
31. Royal Osteoporosis Society. Raise awareness. Available from: <https://theros.org.uk/how-you-can-help/raise-awareness/> [Accessed 07/08/19]
32. National Institute for Health and Care Excellence. 2017. *Osteoporosis Quality Standard*. London: NICE
33. International Osteoporosis Foundation. 2005. *The adherence gap: Why osteoporosis patients don't continue with treatment*. Lyon: IOF

