Royal Osteoporosis Society

Better bone health for everybody

Effective Secondary Prevention of Fragility Fractures:

Clinical Standards for Fracture Liaison Services

Effective Secondary Prevention of Fragility Fractures: Clinical Standards for Fracture Liaison Services

Osteoporosis is a fragile bone disease associated with an increased risk of fragility (low impact) fractures, the consequences of which are significant. Fragility fractures are:

Common: One in two women and one in five men break a bone after the age of 50.[1]

Costly to the NHS and social care: The hospital costs of hip fractures alone are estimated at £1.2 billion.[2–4]

Life-changing to the individual: The impact of fractures may lead to loss of mobility and independence, social isolation and depression.[5]

Costly to employers and individuals: through sick leave resulting in loss of productivity and loss of income – ROS evaluation suggests that 2.6m workdays are lost every year due to fractures.[6]

Many fragility fractures could be prevented by timely interventions to reduce fracture risk. A Fracture Liaison Service (FLS) systematically identifies, treats and refers to appropriate services all eligible patients aged over 50 within a local population who have sustained a fragility fracture, with the aim of reducing their risk of subsequent fractures.

As around 50% of people who experience a hip fracture have broken a bone in the past, FLS represents an ideal opportunity for timely intervention to avert a hip fracture.[7,8]

FLSs are underpinned by evidence demonstrating that they are clinically and cost effective. The principles of evidence-based FLS are presented in the 5IQ model described in this document. By adopting these standards, evidence-based best practice can be implemented and replicated effectively across the UK to reduce the future burden of fractures, improving outcomes for patients and ensuring efficient and appropriate use of NHS resources.

Population: These standards apply to adults in the UK aged 50 or older who have had a fragility fracture.

Audience: These standards have been prepared for the following audiences:

- Healthcare professionals who deliver or wish to develop an FLS.
- Healthcare professionals who are involved in any part of the fragility fracture prevention pathway.
- Commissioners/funders of FLS.
- Managers involved with service provision.
- Adults aged 50 or older who have had a fragility fracture, their carers and families.

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Endorsements:

Arthritis and Musculoskeletal Alliance

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IOF International Osteoporosis Foundation

British Geriatrics Society
Improving healthcare for older people

Contents

Overview: Clinical Standards for Fracture Liaison Services

The six standards described in this document are summarised below. Please refer to the relevant section for context and further information.

FLSs are underpinned by evidence demonstrating that they are clinically and cost-effective.[9] The principles of evidence-based FLS are presented in the 5IQ model[1]. To achieve the benefits shown in the evidence base, all principles will be adhered to.

Standard	Criteria
1 Identify: People aged 50 years and over with a fragility fracture are systematically identified.	1.1. The FLS identifies people aged 50 years or older presenting with a new fragility fracture. This includes: • Newly identified vertebral fracture. (a prevalent vertebral fragility fracture which has not been previously documented) • A new fracture occurring whilst a patient is taking an osteoporosis drug treatment.
2 Investigate: Investigations to assess risk of fragility fractures and falls and possible underlying secondary causes for osteoporosis are offered to people identified by the FLS.	2.1. The FLS offers people identified as being at increased risk of another fragility fracture, an assessment which will include: • Fracture risk assessment, involving use of FRAX® or QFracture® and quality assured axial dual X-ray absorptiometry (DXA) where indicated • Those having DXA may also have a vertebral fracture assessment (VFA) where indicated, such as women age >70 or men >80, and people with historical height loss >4cm and BMD T score <-1.0[48]. • An assessment of falls risk in people aged 65 or over. • Relevant laboratory and imaging investigations to identify any underlying secondary causes of osteoporosis and help inform drug treatment decisions. 2.2. Assessment will be completed within 12 weeks of fracture diagnosis.

1 See diagram on page nine

Standard	Criteria
3 Inform and Involve: Information and support are offered to people (and where relevant their carers) using the FLS.	3.1. The FLS supports shared decision making, uses decision support tools[10], and offers people information tailored to their needs about: • Osteoporosis and risk factors for fracture. • Lifestyle interventions aimed at reducing fracture risk including nutrition and exercise. • Coping with pain and any disability associated with their fracture, psychological and social support.[11] • Drug treatment options for osteoporosis - including information on benefits and side effects. • Reducing falls risk. • Next steps in their care plan including follow-up appointments. 3.2. Information is available in a range of formats and languages, appropriate to the population covered by the service. 3.3. People and their carers understand where to access further information about osteoporosis and support following their appointment. 3.4. Communications from the FLS are written in a style that can be understood by the person and their carers. Communications are directed to the person who has had a fracture as well as the healthcare professionals involved in their care, including their GP. People feel supported and empowered to make informed choices and reach shared decisions about their management plan.
4 Intervene: Interventions to reduce the risk of fragility fractures are offered to people as required.	4.1. The FLS offers appropriate osteoporosis drug treatment to people at high risk of fragility fracture following discussion with the patient and following principles of shared decision making. 4.2. People willing to take drug treatment are offered appropriate osteoporosis drug treatment within 16 weeks of fracture diagnosis (i.e. within 4 weeks of being identified as appropriate for treatment with an osteoporosis medication). 4.3. The FLS refers people at high risk of falling to falls prevention services within 16 weeks of their fracture for interventions to maximise balance and mobility. 4.4. The FLS reviews people who are recommended interventions to reduce risk of fracture 4-8 weeks after a treatment recommendation is made, and at 52 weeks to ensure that: • lifestyle recommendations and treatment decisions are reassessed • where the decision has been taken to treat, it has been started and taken appropriately. • referral to falls reduction programmes has been actioned if appropriate.

Standard	Criteria
5 Integrate: The FLS will integrate with the wider healthcare system to facilitate an inclusive patient pathway; ensuring effective case-finding, onward referrals and long-term management of osteoporosis.	5.1. The FLS prepares clear management plans to ensure good communication across primary and secondary care teams as appropriate to local service delivery, enabling the long-term management of osteoporosis. 5.2. The FLS staff liaises with relevant in-hospital services and primary care teams. 5.3. The FLS staff have a good understanding of the available out-of-hospital services and how people using the FLS can access these. 5.4. FLS and relevant services agree referral pathways between the services. 5.5. FLS advises primary care clinicians of the need for an annual medicines review for patients who are recommended pharmacological treatments to reduce the risk of future fracture.
6 Quality: The FLS demonstrates clinical accountability, ongoing quality improvement, effective governance and funded access to continuing professional development for all practitioners.	6.1. A designated lead clinician is accountable for all components of the service. 6.2. The FLS is developed in line with a local falls and fracture prevention strategy. 6.3. Core data from people identified by the FLS is recorded on an operational database. 6.4. The FLS will have a quality assurance framework in place that should include: • A multidisciplinary group, including patient and carer representation, to coordinate, plan and develop the FLS. • A programme of continuous improvement including regular audit. • Participation in national audits such as the FLS Database (FLS-DB) in England and Wales or the Hip Fracture Audit in Scotland. • Peer review. • Patient, carer and public involvement in coproduction of pathways and experience measures, enabling a whole system approach to value-based healthcare. 6.5. All members of the FLS team have assessment of professional competencies and demonstrate continuing professional development. 6.6. FLS staff are active participants in a regional clinical or professional network.

Introduction

Osteoporosis is the most common chronic bone disease. It affects men and women and leads to weaker bones, which can then lead to 'fragility fractures'. These broken bones occur after low trauma, such as a minor bump or fall that would not normally cause a bone to break. These fractures are the consequence of low bone density and structural deterioration of bone tissue. The World Health Organisation (WHO) has defined a fragility fracture as one which occurs due to forces equivalent to a fall from a standing height or less.

One in two women and one in five men will break a bone after the age of 50 years.[11] Approximately 575,000 fragility fractures occur annually in the UK (this is predicted to increase to 665,000 by 2034).[12–14] At any one time, hip fractures account for occupation of over 3,600 hospital beds across England, Wales and Northern Ireland.[15] Hip fracture accounts for most of the hospital and outpatient costs related to all osteoporotic fractures. The hospital costs alone of hip fractures are estimated at over £1.2 billion.[2–4] This figure excludes the high cost of social care, which adds significantly to this cost.

As well as the significant burden on health and social care resources, the impact of fractures on individuals can be devastating, leading to loss of independence, mobility and capacity to carry out everyday tasks. In a survey conducted by the ROS of more than 3,000 people living with osteoporosis, 33% said that they felt socially isolated by their condition, 42% reported difficulty with domestic chores and one in four experienced long-term pain - of whom, one third say the pain is severe or unbearable.[5]

People who have had one fracture remain at a two- to four-fold greater risk of sustaining another (known as a 'secondary fracture') and 23% of secondary fractures in women aged over 50 occur within one year of the first event.[16-21]

The 5IQ approach[2]: the key objectives for an FLS.

Preventing fractures with Fracture Liaison Services

An FLS systematically identifies, treats and refers to appropriate services all eligible patients aged 50 and older within a local population who have experienced fragility fractures, with the aim of reducing their risk of subsequent fractures.

An FLS is an essential component of a comprehensive and integrated approach to preventing falls and fractures among people over the age of 50 years. Assessment within an FLS should be part of the pathway for all patients with a fragility fracture.

An FLS is centered around processes to:

1. case-find people aged 50 and older who have sustained a fracture
2. investigate underlying causes
3. implement a management plan to reduce the risk of further fractures.

2 See note on page six

An FLS is typically delivered by specialist practitioners and administrators following agreed patient pathways. There is an increase in use of digital technology including artificial intelligence (AI) to support the clinical team. The service may be based in any healthcare setting, either in-hospital or out-of-hospital, and requires support from a medically qualified practitioner (typically a hospital doctor or a GP with expertise in osteoporosis and fragility fracture prevention).

Implementing the standards

FLS implementation and improvement is inconsistent across the UK. Implementation of these standards will range from those needing to commission and develop new services, to well-established services looking for ways to demonstrate improvement and effectiveness.

To effectively prevent fractures, an FLS will deliver all six standards outlined in this document. The methods used for doing so will vary according to staffing and resources available locally. Tools and support in developing or improving an FLS are available from the ROS (see **Implementing the FLS standards** for full details and the **FLS-DB**).

Assessing service performance

Participation in national audits facilitates assessment of performance as well as providing a benchmark against national levels of achievement.

All FLSs should actively participate with data driven service improvement. In England and Wales all FLSs are expected to actively participate with the FLS-Database of England and Wales using internationally agreed key performance indicators.[22]

Services may also be recognized at the international level by participating in the International Osteoporosis Foundation's Capture the Fracture® Programme to benchmark at the global level. This programme includes a set of 11 patient-level KPIs to guide quality improvement in FLS.[23,24]

Services can also be assessed at a local level. Examples of audit and evidence of achievement are given for each standard. Additionally, use the 'what this means to a member of staff and the organisation' sections to assess your practice and processes.

A list of key performance indicators is included in the FLS Implementation Toolkit (see **Implementing the FLS standards**).

Working with national guidance and policies

These standards have been developed to be used alongside national guidance for the prevention of falls and fractures produced by National Institute of Health and Care Excellence[25–30], Scottish Intercollegiate Guidelines Network[31] and the National Osteoporosis Guideline Group[32] Clinical protocols will be developed locally, based on relevant national guidelines.

The standards also align with the principles of the FLS-DB[67], Realistic Medicine,[33] Prudent Healthcare,[34] A Healthier Wales,[35] the Welsh Government's Quality statement for osteoporosis and bone health,[36] Making Every Contact Count[37], and with quality improvement programmes delivered by NHSE's Getting It Right First Time programme.[38]

Using these standards as a patient, carer or family member

As well as helping health services understand how to deliver high-quality, evidence-based care, this document can be used by patients and their carers, family and friends. Each section explains what each standard means to people over the age of 50 who have broken a bone. It can help you to check whether you've received care that meets these standards and to have informed conversations with your healthcare team.

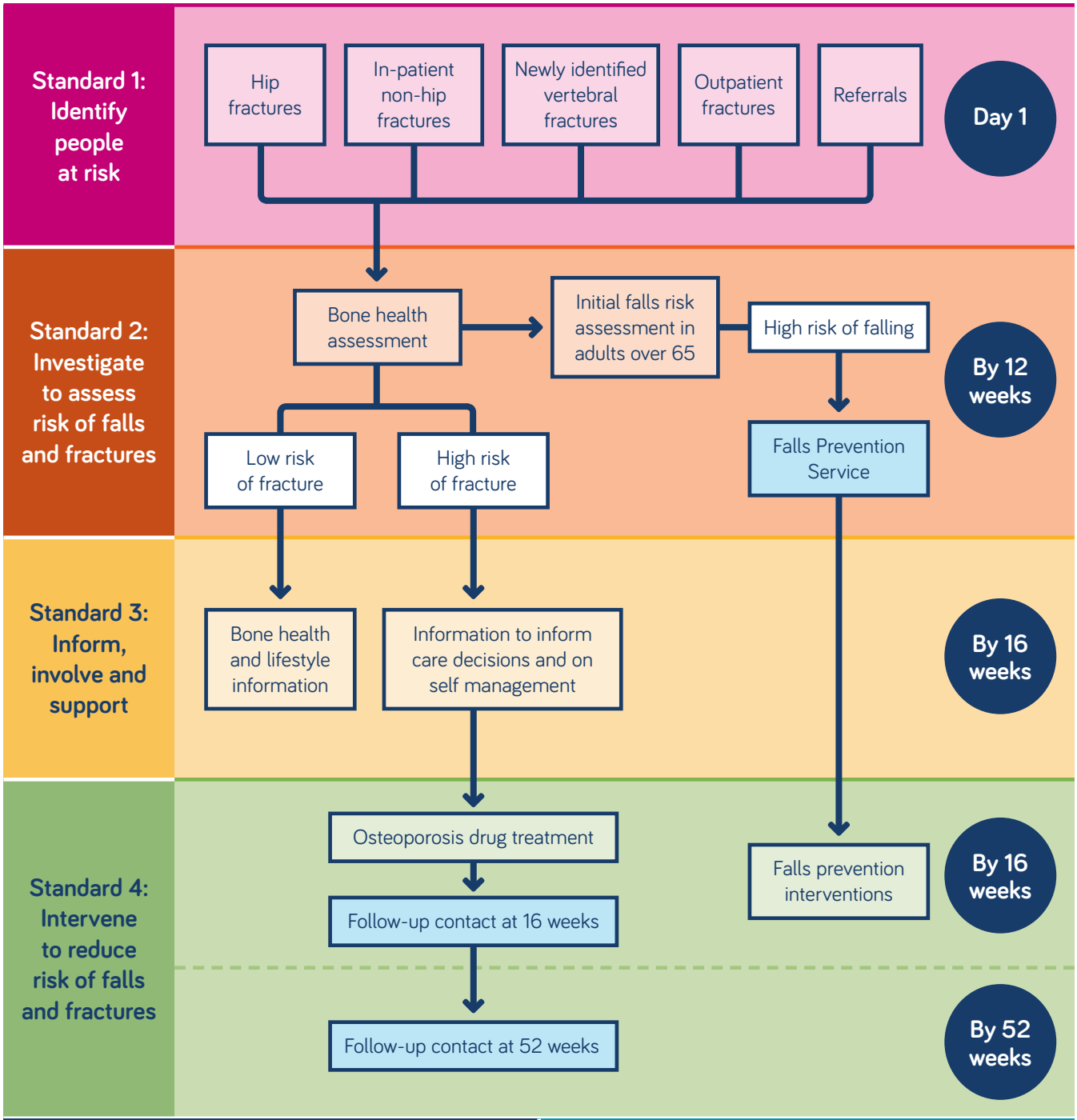
The checklist can be used by patients, their carers and families to make sure they are getting everything they should, and at the right time.[3]

Day 1	The date your broken bone (fracture) was diagnosed in the NHS
By 12 Weeks	You should be assessed by an FLS and, if necessary, have had a DXA scan to measure your bone density as part of your assessment, and offered a drug treatment if appropriate
By 16 Weeks	If prescribed a drug treatment to reduce your risk of further broken bones, you should be contacted to ensure you have started the drug treatment and are able to take it and tolerate potential side effects.
By 16 Weeks	You should be asked if you have started your strength and balance exercise classes, if you were referred to one.
By 52 Weeks	If prescribed osteoporosis drug treatment to improve your bone health, you should be contacted to find out how you are getting on and whether you are tolerating the drug treatment.
By 3-5 Years	Most osteoporosis drug treatments need to be taken for at least 3-5 years to protect your bones. Your doctor will review your bone health and discuss the next steps with you. This may be continuing the treatment you're already taking, switching to another treatment or pausing treatment for a short period.

3 Adapted from Strong bones after 50: FLS explained [68]

Understanding what the Clinical Standards mean to healthcare professionals

This diagram summarises the components of an FLS outlined in this document



Standard 5: Integrate for long-term management and holistic patient care

- ✓ Patient-centred management plans
- ✓ Relationships with in-hospital services
- ✓ Relationships with out-of-hospital services
- ✓ Referral pathways
- ✓ Fracture prevention interest group

Standard 6: Quality through leadership, governance and development

- ✓ Leadership
- ✓ Fracture prevention strategy
- ✓ Data collection
- ✓ Quality assurance and improvement
- ✓ Continued professional development
- ✓ Regional clinical network

Identify

Standard 1: People aged 50 years and over with a fragility fracture are systematically identified.

Rationale

People aged 50 years and over who have had a fragility fracture need to be identified by the FLS to ensure they undergo investigations to assess their need for intervention. Deploying a range of case finding strategies will yield the best results. Strategies used will depend upon local service models and pathways.

Criteria

The FLS identifies people aged 50 years or older with:

- A new fragility fracture
- Newly identified vertebral fracture/s
- A new fracture occurring whilst a patient is taking an osteoporosis drug treatment.

In practice

Identifying people aged 50 years or older with a new clinical fracture is a core responsibility of an FLS. This is undertaken by the 'FLS coordinator' who is typically a dedicated Clinical Nurse Specialist, although this role may also be undertaken by Allied Health Professionals (AHPs), Healthcare Scientists or competent non-clinical personnel. Digital and AI technologies, that are evidenced to effectively support the identification of target patients and that are cost effective, are likely to have an increasing role in identification. Commissioning and embedding these technologies need to be considered as part of the pathway effectiveness and business case.

FLSs will include for assessment all people aged 50 years or older who have sustained:

- A new fracture at any skeletal site.
- A newly identified vertebral fracture, even if the timing is uncertain. Vertebral fractures may present clinically but may also be identified from radiology reports or AI assessment of imaging undertaken for an unrelated clinical indication.

Exceptions include fractures of skull, facial, digit and scaphoid bones that are typically caused by a traumatic injury.

However, FLS evaluation is appropriate even after a traumatic fracture, if it has occurred in a person with known risk factors for fragility fracture and is likely to be at risk of osteoporosis.

Identification of new clinical fracture presentations is achieved most readily by an in-hospital FLS. In addition to using hospital IT systems, AI technology, radiology information system searches and digital systems, the FLS coordinator can facilitate the identification of patients with new fractures through engagement in orthopaedic ward rounds, trauma team meetings and attending fracture clinics. All these approaches provide the opportunity to meet patients personally to educate and invite them to attend for further investigation. Patients are more likely to respond to direct personal invitation.

An out-of-hospital FLS will rely on reporting from fracture clinic and/or radiology departments, so close liaison with local secondary care centres needs to be established at the outset to enable seamless, continuous capture of all relevant cases. Out-of-hospital FLSs are well-placed to identify patients with prior fragility fracture history (prevalent fractures) from GP systems, whereas these will remain a challenge for in-hospital FLSs.

It is unlikely that any single approach will identify all patients with a new fracture and the FLS coordinator will customise screening methods to suit local systems and need. It is recommended that multiple strategies are used for identification to maximise the number of patients who could benefit from intervention.

An FLS will aim to identify all patients from the following groups:

- Inpatients on acute orthopaedic/ trauma wards.
- Inpatients on general medical/care of the older person wards not requiring surgical fixation (e.g. pelvic, upper limb, acute vertebral fracture presentations).
- Patients presenting acutely and not requiring hospital admission but managed as outpatients via orthopaedic / emergency medicine fracture clinics.
- Patients presenting acutely but not requiring hospital admission or fracture clinic follow-up.
- Patients with vertebral fractures that are newly identified from imaging or radiology reports.
- Patients with new fractures sustained during a hospital stay.
- Patients who fracture whilst away from home and present later to local orthopaedic or primary care services.

Some examples of how patients may be identified are described below.

Inpatient fractures

People who need to stay in hospital after their fracture are not only at highest future fracture risk, but also are among the easiest to identify in a hospital-based FLS.[20,21,39]

Identify these patients by:

- ✓ Liaising with orthopaedics, orthogeriatricians and trauma nurses
- ✓ Attending trauma meetings
- ✓ Using IT/informatics systems

Liaison with local orthopaedic and trauma teams is essential to agree roles and responsibilities for identifying people aged 50 or older who have had a fragility fracture, and to agree access to the FLS for people under the care of orthopaedic or emergency departments.

A fall during a hospital stay may result in a fracture. These will be identifiable via incident reporting systems (such as Datix), seen in fracture clinic or transferred to orthopaedics. It is important that these patients are identified and assessed by the FLS.

Outpatient fractures

People who have a fracture and are managed in fracture clinics are another readily identifiable group.

Identify these patients by:

- ✓ Reviewing emergency department lists
- ✓ Screening fracture clinic notes
- ✓ Reviewing primary care records
- ✓ Linking with virtual fracture clinics

Vertebral fractures

Vertebral fractures are the most common osteoporotic fractures. They are a powerful predictor of further fracture, yet often account for less than 5% of clinical fracture presentations to FLS.

Identify these patients by:

- ✓ Liaising with radiology to identify vertebral fractures which are incidental findings on images
- ✓ Carrying out vertebral fracture assessment (VFA)[28,29] (see **Investigate**)
- ✓ Liaising with physiotherapy-led musculoskeletal back pain services or other interface services where people present with back pain.

Vertebral fractures are often identified incidentally on plain X-rays, CT and MRI scans. Guidance on identification and reporting of vertebral fractures is given by the ROS.[40] This recommends that radiology:

- Review the spine in all images of the chest, abdomen and pelvis.
- Report vertebral fractures clearly using the term ‘vertebral fracture’.
- Recommend further assessment and management to reduce fracture risk.

Referral into FLS

Referrals should also be encouraged into the FLS from other services, such as GPs, pain clinics, interface services and falls services.

What this standard means to:

A person receiving care

You will be identified by the FLS if:

- You are aged 50 years or older and you have broken a bone more easily than you'd expect (known as a 'fragility fracture').
- A healthcare professional finds you have had a vertebral fracture (a broken bone in your spine). Some people can have a vertebral fracture without realising and with no obvious symptoms, but they could benefit from medication to protect them from further broken bones in the future.

A member of staff

You will:

- Follow agreed protocols to ensure that people with fragility fractures are identified by the service.
- Use images or imaging reports to identify people with vertebral fractures.
- Work with colleagues in other departments and specialties to establish protocols to maximise the identification of people at risk of osteoporosis.

The organisation

The organisation will:

- Allow access for FLS practitioners to relevant IT systems that will support identification of patients presenting with a fracture. This may require cross-organisational collaboration.
- Support services such as orthopaedics, emergency departments and imaging to come together to support the work of FLS practitioners.
- Have procedures in place to ensure that all inpatients and outpatients with fragility fractures are identified by the FLS.
- Have procedures in place to ensure that all images which include the spine are scrutinised for the presence of vertebral fractures and that these are reported clearly with signposting to the FLS.
- Put in place adequate resources to meet the demand of its population.

Examples of audit and evidence

Identification (all fragility fractures)

Percentage of patients identified compared with the local estimated case load.

- Numerator – number of people with fragility fractures identified by the service.
- Denominator – estimated total number of fragility fractures for the service (estimated by multiplying total hip fractures in patients aged over 50 by a factor of five.[67]

Identification (vertebral fractures)

Percentage of patients with a vertebral fracture compared with local expected case load.

- Numerator – number of people with vertebral fractures identified by the service.
- Denominator – estimated number of vertebral fractures (estimated by multiplying total hip fractures in patients aged over 50 by a factor of 0.75). [67]

Repeat fractures

Number of patients identified with a fracture already on an osteoporosis drug treatment.

- Numerator – number of people with a fracture already taking an osteoporosis drug treatment.
- Denominator – total number of people with fragility fractures identified by the service.

Vertebral fracture reporting

Audit standards for identification and reporting of incidental vertebral fractures are outlined in 'Clinical Guidance for the Effective Identification of Vertebral Fractures'.[40] Audit of vertebral fracture reports will quantify the diagnostic gap and inform service development, including the case for funding the vertebral fracture identification pathway.

Investigate

Standard 2: Investigations to assess risks of fragility fractures and falls and possible underlying secondary causes for osteoporosis are offered to people identified by the FLS.

Rationale

A comprehensive multifactorial assessment will ensure that interventions to prevent secondary fractures are appropriately targeted to the people that need them following the principles of shared decision-making.

Prompt assessment and intervention are needed as the risk of having a further (secondary) fracture is high in the first year following a fracture. Investigations will occur as soon as feasible after the fracture so that interventions are not delayed. Investigations, results and reports will be completed within 12 weeks of the fracture diagnosis.

FRAX® and QFracture® are the recommended fracture risk assessment tools in the UK.

FRAX® may be used in conjunction with bone mineral density (BMD) results from axial DXA neck of femur BMD measurement.

A falls risk assessment is also important as most fractures will result from a fall.

Criteria

2.1. People identified as being at increased risk of another fragility fracture are offered an assessment which will include:

- A fracture risk assessment, involving use of FRAX® or QFracture® and quality assured axial dual X-ray absorptiometry (DXA) where indicated.
- Those having DXA may also have a vertebral fracture assessment (VFA) where indicated, such as women age >70 or men >80, and people with historical height loss >4cm and BMD T score <-1.0[48].
- An assessment of falls risk in people aged 65 or over or presenting with risk factors for falls.
- Relevant laboratory and imaging investigations to identify any underlying secondary causes of osteoporosis and help inform drug treatment decisions.

2.2. Assessment will be completed within 12 weeks of fracture diagnosis.

In practice

An FLS consultation needs to cover the following areas:

- Discussion of how the fracture happened and the impact it has had on the patient.
- Assessment of risk factors using a fracture risk assessment tool.
- A DXA +/- VFA as appropriate to measure BMD and assess for the presence of vertebral fractures.
- Laboratory tests to look for underlying causes of osteoporosis and to aid treatment decisions.

Fracture risk assessment

BMD, a prior fracture, age and gender are the most powerful contributors to future fracture risk. These and other key risk factors have been used to develop tools that allow assessment of fracture risk.

There are several fracture risk assessment tools, including FRAX® and QFracture®, which are recommended for use in the UK. National Guidance makes recommendations about inclusion of these risk assessment tools in clinical pathways and should be used to develop local protocols.[28, 31, 32]

As with any assessment tool or guidance, clinical judgement should always be used in their interpretation. Users need to be aware of limitations of these risk tools. For example the tools do not take into account the site, recency or number of fractures.

DXA scans

DXA scans measure BMD which is then used to support clinical decision by:

- Making a diagnosis of osteoporosis, identifying low bone mass (osteopenia) or ruling out low bone mass in accordance with WHO criteria.
- Refining fracture risk assessments within the FRAX® tool.
- Measuring changes in BMD against a baseline scan to direct individual patient management.

As DXA scans utilise X-rays, they are regulated under the Ionising Radiation (Medical Exposure) Regulations (IR(ME)R) and should only be used where there will be an impact on onward management of the patient.[41–47]

Although BMD should be measured in most situations after a fracture, exceptions should be considered when knowledge of BMD will not alter patient management (e.g. in patients with hip fractures where anabolic therapy is contra-indicated or inappropriate) and in cases where measurement of BMD is technically not feasible.

Vertebral Fracture Assessment (VFA)

As well as providing a BMD measurement, DXA can be used to assess for vertebral fractures. VFA scans are quick to perform, involving very little extra X-ray exposure. They can reliably identify the presence of vertebral fracture. Guidelines produced by the International Society for Clinical Densitometry[48] can be used to develop local protocols.

Other investigations

Patients believed to be at increased risk of fracture will have investigations to guide treatment selection and ensure treatment safety. From the point of view of safe prescribing, where a bisphosphonate treatment is recommended the following investigations will be carried out as a minimum in all patients:

- urea & electrolytes (U&Es) with estimated glomerular filtration rate (eGFR). Creatinine clearance should be used in those aged over 75 or with a BMI below 18 or above 40.[49]
- bone profile tests (adjusted calcium, albumin and alkaline phosphatase).

Laboratory tests should not be more than three months old at the point of making treatment decisions. It is important to recognise that clinical conditions can change rapidly and, in some situations, contemporary blood test results may be required.

Other investigations may be appropriate for individual patients depending on the clinical presentation and local protocols to assess for underlying secondary causes of osteoporosis and high fracture risk. These may include: [a]

Routine

- Clinical history
- Physical examination including measurement of height and assessment of thoracic kyphosis – where FLS pathway includes face to face appointments
- Full blood cell count
- Erythrocyte sedimentation rate or C-reactive protein
- Serum calcium, albumin, creatinine, phosphate[b], alkaline phosphatase[a] and liver transaminases
- Serum 25-hydroxyvitamin D
- Thyroid function tests

Other investigations, if indicated

- Serum electrophoresis, serum immunoglobulins and serum free light chain assay
- Plasma parathyroid hormone (PTH)[c]
- Serum testosterone, sex hormone binding globulin, follicle stimulating hormone, luteinizing hormone
- 24-hour urinary free cortisol/overnight dexamethasone suppression test
- Serum prolactin
- Serum magnesium if hypocalcaemic
- Tissue transglutaminase antibodies, +/- endomysial antibodies (coeliac disease screen)
- Urinary calcium excretion
- Markers of bone turnover (e.g., CTX, PINP)[d]
- Lateral radiographs of lumbar and thoracic spine or DXA based VFA scan
- Isotope bone scan

a Adapted from the NOGG Guideline.[29]

b Persistent low phosphate or alkaline phosphatase should not be overlooked as this can indicate underlying metabolic bone disease.

c Measure PTH if hypercalcaemia or in assessment of renal bone disease.

d Biochemical markers may be helpful in the monitoring of osteoporosis treatment, but can be affected by fracture and difficult to interpret in the context of an FLS consultation.[50]

Other investigations, for example, bone biopsy and genetic testing for osteogenesis imperfecta, are largely restricted to specialist centres.

Falls risk assessment

In line with NICE guidance on preventing falls in older adults,[25] FLS staff routinely ask people aged 65 years and older whether they have fallen in the past year and about the frequency, context and characteristics of their fall/s.

World Falls Guidelines[51] recommend three questions with intervention if any one is positive:

- **Have you fallen in the past year?**
  Why it matters: A history of falls is one of the strongest predictors of future falls.
- **Do you feel unsteady when standing or walking?**
  Why it matters: Feeling unsteady can indicate balance or mobility issues.
- **Do you worry about falling?**
  Why it matters: Fear of falling can lead to reduced activity, which weakens muscles and increases fall risk.

Older people reporting a fall or considered at risk of falling should be observed for balance and gait deficits and considered for interventions to improve strength and balance. This may also be appropriate in people aged 50-64 seen by the FLS who have risk factors for falls. FLS coordinators will need adequate training and expertise in these initial assessment techniques.

An FLS will work closely with local falls services to determine access to appropriate pathways to ensure early falls risk assessment and intervention post-fracture. The responsibility for any subsequent multifactorial falls assessment and targeted intervention will lie primarily with local falls services but, depending on local arrangements, elements of this assessment may be conducted by an FLS with relevant skills. In this situation, there must be clear and timely referral to the necessary evidence-based intervention pathways (see **Integrate**).

What this standard means to:

A person receiving care

You will:

- Be asked about your needs and what is important to you, medical history and you may have a bone density scan (an x-ray scan also known as a DXA) and blood tests. The information gathered will be discussed between you and your healthcare professionals so you can make decisions about what can be done to help reduce your risk of breaking a bone in the future.
- Be asked about whether you have fallen in the past year and your healthcare professional will look at how you walk (if in person). If you are over 65 and have fallen two or more times., or your balance and the way you walk suggest you would benefit from specialist help, you will be invited to meet other specialist healthcare professionals who will be able to assess your risk of falling in the future.
- Receive the final FLS report prepared by the healthcare professionals who assess you. This will include results from your assessment and whether you will benefit from an osteoporosis drug treatment to strengthen your bones. Your GP will also receive a copy.

A member of staff

You will:

- Carry out a comprehensive assessment considering all aspects of bone health. This may include fracture risk assessment using FRAX® or QFracture®, DXA, VFA, blood tests and review of imaging as appropriate.
- Ask whether the person has fallen in the past year, observe their gait and balance (if in person), and refer them to falls prevention services for further assessment where indicated.
- Share final FLS reports (including DXA scan and tests results, as well as treatment and intervention recommendations) with relevant healthcare professionals and the person who has been assessed.

The organisation

The organisation will:

- Support two-way referral processes between the FLS and the falls prevention service.
- Ensure sufficient quality-assured DXA scanning and reporting is available in a timely manner for the population it serves.
- Ensure there are appropriate staff to run the FLS within waiting time requirements and FLS standards.

Examples of audit and evidence

Time to FLS assessment

Percentage of patients who were assessed by the FLS within 12 weeks of their fracture:

- Numerator – people who have had an assessment within 12 weeks.
- Denominator – total number of people identified by the FLS.

Waiting time to FLS assessment

Average waiting time to FLS assessment.

Time to DXA

Percentage of patients who had a DXA ordered or recommended and were scanned within 12 weeks of fracture:

- Numerator – number of people who were scanned within 12 weeks.
- Denominator – number of patients who had a DXA ordered or recommended.

Falls assessment

Percentage of patients who received a falls assessment or were referred or recommended for a falls risk assessment:

- Numerator – number of people who receive or were referred for a falls risk assessment.
- Denominator – total number of people seen by the FLS.

Correspondence to people

Percentage of people who were sent copies of correspondence:

- Numerator – number of people who were sent a copy of correspondence from the FLS.
- Denominator – total number of people seen by the FLS.

Clarity of correspondence

Proportion of respondents to the patient satisfaction survey who found copies of correspondence from the FLS easy to understand:

- Numerator – number of people who felt that correspondence was easy to understand.
- Denominator – total number of people who responded to the patient satisfaction survey.

Inform and Involve

Standard 3: Information and support are offered to people encountering the FLS, and, where appropriate, their carers.

Rationale

By giving people (and where appropriate, their carers) information in formats that meet their needs, interests and concerns, people can be effectively supported to understand their condition and make decisions. Information must be tailored to meet individual needs regarding health literacy and ease of accessibility. Shared decision making is recommended by NICE, and is a vital mechanism for supporting adherence to treatment which is a challenge for most patients.[10] An effective starting point for clinicians is to recognize that non-adherence to medication is the norm. To be successful in adhering to treatment, patients need support and information. They will also need to revisit the 'conversation' as their health, needs and circumstances change over time.[52]

To support medicine adherence FLS should:

- Elicit and address patient beliefs about what osteoporosis is and why the condition is important in long term health.
- Establish what involvement the patient would like to have in making decisions about medicines (e.g. do they like to have all the information first or prefer to be guided).
- Explain the role of medicines, be careful to address any concerns regarding side-effects and give advice regarding the practical requirements of the medication regimen.[52]
- Acknowledge that patients decide whether to take medication or not; ask what their decision is and offer further support if they are unsure.

Criteria

3.1. Patients are offered information according to their needs,[53] the clinician:

- Asks the patient what they are expecting from the appointment and the aim of the appointment is explained to them. That is, to investigate for underlying osteoporosis, estimate their risk of future fracture and to consider steps to improve their bone health and reduce chance of further fractures.
- Asks how the fracture happened and about the impact it has had on their life.
- Asks the patient what they already know and think about osteoporosis, osteoporosis medicines (including any concerns they have around these), and how important maintaining independence is to them.
- Establishes what involvement the patient would like to have in making decisions about medicines.
- Explains:
  - what osteoporosis is - osteoporosis means bones are weaker and may be likely to break (fracture) after a minor bump or fall; does not give you physical symptoms (e.g. pain) unless you break a bone.
  - what the causes are – the patient's risk factors.
  - what the consequences are – that they are more likely to break bones such as wrist, hip or bones in the spine (including an explanation of how spinal fractures occur when the bone squashes down and may cause pain and curving of the spine).
- Focuses on how finding osteoporosis is a good thing because we can do something about it by:
  - keeping up a healthy lifestyle (bone healthy nutrition, not smoking, alcohol moderation, regular exercise) to maintain bone health and strength. It is important to explain that diet, exercise and supplements cannot be viewed as a substitute for medicines as there is not

evidence that on their own they lower the risk of broken bones.

- taking osteoporosis medications which will lower the risk of breaking bones in the future if taken regularly. It is important to explain how medicines lower the risk of broken bones using simple numbers and pictures and to explain that osteoporosis medicine does not make you feel better and that it is not possible to 'feel' stronger bones.

- Provides advice regarding how to cope with pain and any disability associated with their fracture.
- Explains their drug treatment options for osteoporosis management – including why it is recommended, information on benefits and side effects, what is involved in taking it and how long for.
- Provides information about how to reduce their falls risk.
- Explains what the patient can expect to happen next in their care plan including when they can expect a follow-up telephone call and other follow-up appointments.

3.2. Information is available in a range of formats and languages, appropriate to the population served by the service.

3.3. Verbal information is delivered using 'chunk and check' approach - clinicians check patient understanding regularly during the conversation.

3.4. People and their carers understand where to get further information about osteoporosis and support following their appointment.

3.5. Communications from the FLS are written in a style that can be understood by the person. They are written to the person who has had a fracture and copied to the healthcare professionals involved in their care, including their GP.

3.6. People feel supported and empowered to make informed choices and reach shared decisions about their management plan.

3.7. Provide contact details for the FLS to the patient and written information about osteoporosis, fracture risk, risks and benefits of treatment, information to give their dentist and advice on local and national support groups including the ROS.

In practice

Patient education is an important component of an FLS. The priorities are to cover simple key points and back this up with information resources in appropriate formats.

The FLS will cover the areas outlined in criteria 3.1 and will allow sufficient time within the appointment to encourage people to ask questions, provide information about other services they will be referring people to (such as falls prevention, physiotherapy, pain clinics etc.) and explain the next steps in their care. Where a patient lacks mental capacity to make decisions, appropriate carers, family or friends will be involved in discussions and decisions.

Giving someone a diagnosis can be overwhelming for the person concerned and people may not absorb or understand all that is explained to them during their appointment. A summary of key information in an appropriate format will be offered and people will be signposted as to how to get further information following their FLS appointment. This may include useful websites, by contacting staff at the FLS or through an information helpline such as the nurse-led Helpline run by the ROS.

If resources are available, group education sessions are popular and ensure that there is a range of options to suit different preferences. These can be led by either peers or healthcare professionals and can be offered as a series of group sessions or individual meetings.

All written communications and materials need to be easily understood by the person who has had a fracture, or their carer. It is good practice that communication, such as letters and email, is directed to the person and that their GP receives a copy of reports and letters from the FLS to facilitate their on-going management[31].

Consultation guides or proformas might be used to help ensure all elements of information giving/ eliciting are covered.[54]

What this standard means to:

A person receiving care

You will:

- Feel involved, informed and supported.
- Be given opportunities to ask questions, discuss options and participate in decisions about your care.
- Understand your bone health and what you can do to keep your bones strong.
- Understand your diagnosis and your risk factors for broken bones (bone density etc.)
- Understand the benefits and side effects of treatments recommended for you.
- Understand how to take treatments recommended for you and what to do if you have any difficulty taking your treatment.
- Receive contact information for your local osteoporosis service and/or regional and national charities, including the ROS, which can give you more information and support whenever you need it.
- Be given information in the format that best suits you.
- If you are experiencing symptoms from your fractures (e.g. spinal fractures) you should be signposted to appropriate physio, exercise, and advice.

A member of staff

You will:

- Ensure the information and support needs of people aged 50 and older (and where appropriate their carers) are considered at each stage of the FLS pathway.
- Tailor the information you give to meet the needs of the individual.
- Allow time for people to ask questions, discuss options and participate in decision-making.
- Reinforce the information you give verbally with other formats where appropriate.
- Provide information on bone health to everyone coming through the service.
- Provide information about the individual's risk factors for fracture including BMD.
- Provide information on treatment options, including their benefits and side effects where appropriate.
- Acknowledge the challenge of adherence to treatment and explain its importance.
- Ensure people with symptomatic vertebral fractures receive appropriate signposting to physiotherapy, exercise and advice.[55]
- Ensure that people have contact information for the service and/or regional and national charities, including the ROS, which can offer further information and support.
- Run group education sessions.

The organisation

The organisation will:

- Hold information in a range of formats and languages suitable for the population it serves.
- Provide training for staff in shared decision making and supported self-management.
- Provide sufficient time in appointments to enable discussion between people and their healthcare professionals.
- Provide resources for regular patient education sessions to give information and support to people at risk of fragility fractures.

Examples of audit and evidence

Understanding of where to get more information
Percentage of patients who respond to patient survey indicating that they understand where to get further information.

- Numerator – number of people who understood where to get further information.
- Denominator – total number of people who responded to the patient satisfaction survey.

Involvement in management plan
Percentage of patients who respond to patient survey and agreed they felt they were jointly involved in agreeing with their management plan.

- Numerator – number of people who felt they were jointly involved in agreeing their management plan.
- Denominator – total number of people who responded to the patient satisfaction survey.

Group education sessions
Proportion of people seen by the service who were invited to attend a patient education session.

- Numerator – number of people invited to attend a patient education session.
- Denominator – total number of people seen by the FLS.

Proportion of people invited by the service who attended a patient education session.

- Numerator – number of people who attended a patient education session.
- Denominator – total number of people invited to attend a patient education session.

Proportion of people who found the patient education session useful.

- Numerator – number of people who responded that they found the education session useful.
- Denominator – total number of people who attended a patient education session.

Providing targeted information to meet an individual's needs
Various techniques can be used to tailor how information is given to patients and support patient understanding.[56] Techniques to help staff reflect on practice include pathway feedback, shadowing by peers or expert patients and case studies.

Intervene

Standard 4: Interventions to reduce the risk of fragility fractures are offered to people as required.

Rationale

Intervention following FLS assessment will comprise a tailored package of care that addresses modifiable fracture risk factors that have been identified for each person.

There are a range of effective osteoporosis drug treatments available and national guidance gives advice about how these will be used.[11,14–17,32] Local protocols will be developed using appropriate national guidance.

Many fragility fractures occur following a fall, and many of the risk factors contributing to falls are modifiable with appropriate interventions. Clinical trials of falls interventions have not yet demonstrated a clear effect on reducing fracture risk. However, it remains important to identify those people who are at an increased risk of falls and refer into the falls prevention pathway.[33,34] Exercise can also reduce fear of falling and improve confidence.[35] It may help to promote bone strength as well as help with the symptoms caused by vertebral fractures, especially postural changes and back pain.[36]

Following-up with people to check that their osteoporosis drug treatment has been started and is being correctly taken is an essential component for an FLS to be effective. Attention from a healthcare professional can increase treatment adherence significantly.[37] In population terms, adherence of at least 80% is required to achieve significant fracture risk reduction.[38]

Criteria

4.1. FLS offers people at high risk of fragility fracture appropriate drug treatment, with the opportunity for informed and shared decision making using appropriate decision support tools.

4.2. People at high risk of fragility fracture willing to take offered medicines are initiated on an appropriate drug treatment by FLS or primary care within 12 weeks of fracture diagnosis (i.e. within four weeks of the assessment being completed).

4.3. People at high risk of falling are referred to falls prevention services and offered interventions within 16 weeks of their fracture to maximise balance and mobility.

4.4. People who are recommended interventions to reduce risk of fracture will be reviewed by the FLS to assess adverse effects or assess the need for a treatment switch within 16 weeks of fracture and at 52 weeks to ensure:

a) Treatment has been started and is being taken appropriately.

b) Referral to falls reduction programmes have been actioned.

c) Information needs have been met.

In practice

Decisions about treatment interventions will be based on information gathered through clinical assessment, and local protocols derived from national evidence-based guidance.

Osteoporosis drug treatments

The most appropriate osteoporosis drug treatment will be selected according to the individual's needs. Treatment choice will consider patient preference and an analysis of benefit versus risk (side effects). The person who has had a fragility fracture will be included in this decision-making process.

An optimal treatment choice should be supported by a strong evidence-base and should have demonstrated benefits in terms of reducing vertebral and non-vertebral (including hip fracture) fracture risk.[26,29–32,57,58] Treatment decisions will also consider the individual's circumstances (physical, social, comorbidities, phobias (e.g. needles)) and preferences.

A generic oral bisphosphonate will be recommended as the first treatment choice for most people.[29] These treatments are effective at reducing fracture risk at low cost.

A number of licensed injectable treatments are available and feature among first, second- and third-line options. Intravenous zoledronate may be used as first line following hip fracture for example. These offer some potential advantages over oral treatments, including faster onset of action, no reliance on gastrointestinal absorption, no direct upper gastrointestinal side effects, reduced frequency of administration and better assured adherence with pharmacotherapy. Patients with complex comorbidities, cognitive impairment, multiple drug intolerances or severe fracture risk may benefit from parenteral treatment.

Supplementary treatment

Vitamin D is generally recommended concurrently with a drug treatment for osteoporosis with the addition of calcium depending on dietary intake. There is some evidence that combined calcium and vitamin D supplementation alone may reduce fracture risk in frail older women living in care homes.[59] A calcium calculator, such as the one developed by the University of Edinburgh[60] can help review dietary calcium intake. Where calcium intake is adequate, a vitamin D supplement alone can suffice. Further guidance on managing vitamin D deficiency in people with or at risk of bone disease is given by the ROS.[61,62]

Onset of effect

Different osteoporosis drug treatments are likely to have different speeds of onset to achieve greatest fracture risk reduction. In clinical studies, non-vertebral fracture risk reduction has been shown with 12–18 months of oral drug treatment.[41] One meta-analysis suggests risk reduction may occur as early as six months after starting treatment.[63] However long an individual treatment takes to reach fracture risk reduction, it is likely to require at least several months of pharmacotherapy, during which time non-pharmacological interventions such as falls risk-reduction strategies assume significant importance.

Falls prevention

The FLS will link closely with falls prevention services and ensure that people assessed as being at risk of falls are referred for appropriate interventions. In most cases, the development of an individualised multifactorial intervention will be undertaken by the falls prevention service, which may comprise:

- Muscle strength and balance training.
- Home hazard assessment and intervention.
- Vision assessment and onward referral if required.
- Medication review with modification/withdrawal.

Direct exercise programs and/or referrals for home hazard modification may take place in some FLSs following initial triage assessment by the FLS. This depends on local falls service arrangements and will be agreed locally.

Regular balance exercises are recommended for anyone who is unsteady, or older than 65 years and not doing regular active leisure or sports.[64]

Exercise to promote bone strength

Weight-bearing exercise interventions have a benefit on both hip and spine BMD.[31,64] Combining weight-bearing and impact exercise interventions with muscle strengthening exercise, ideally incorporating progressive resistance training, is recommended. Additionally tailored exercise in the presence of symptomatic vertebral fracture is recommended.[55] Further advice is given in ROS' *Strong, Steady and Straight: An expert consensus statement on Physical Activity and Exercise for osteoporosis.*[64]

Effective follow-up

The effectiveness of an FLS is critically dependent on sufficient long-term adherence to interventions. Many clinical reviews have shown long-term treatment concordance with oral bisphosphonate treatment to be poor. Maintaining patients on treatment is critically important in achieving reductions in future fracture risk. Most studies suggest that, when there is a problem with osteoporosis medication, the person taking the medication will stop taking this within the first six months or so.

To improve long-term treatment rates, patients should be advised to contact their GP or local FLS team should they have any problems or concerns about their treatment so that alternatives can be considered as required.

Furthermore, an FLS will proactively check that patients are started on the recommended treatment (see 16-week follow-up below). A further check of longer-term treatment adherence is required at around 52 weeks from fracture (see annual follow-up below).

16-week follow-up: An initial follow-up contact will be carried out by the FLS within 16 weeks from fracture to check that recommended interventions have commenced, and if so, to check that osteoporosis medications are tolerated, taken as directed and for side effects. This is also a good opportunity to reinforce the importance of lifestyle measures, calcium, vitamin D, and to ask whether the person has fallen or fractured again.

Follow-up will allow people to express any doubts and concerns about their treatment and an opportunity to check how and if medicine is being taken, explore and address any doubts about the need for treatment, explore and address concerns about experienced or feared side effects, and address any questions about practical issues.

This 16-week follow-up should also be used to make sure that referrals to other associated services (such as falls services) have been actioned.

52-week follow-up: Follow-up contact described above will be repeated at 52 weeks from fracture, by the FLS. At this point, adherence with recommended osteoporosis drug treatments will be checked with the patient to explore whether they are taking the medicine and if it is being tolerated. Following this, long-term management will be transferred to primary care (see **Integrate**).

What this standard means to:

A person receiving care

You will:

- Be offered osteoporosis medication within 12 weeks of your fracture if required and have the opportunity to have a discussion with a specialist health professional about what medicines achieve, any side effects and how the medicine is taken.
- Receive your prescription, if appropriate, within 12 weeks of your fracture
- Understand the importance of taking your treatment regularly and as directed and understand why these instructions are important.
- Know who to contact if you have any difficulties or concerns.
- Understand when and where you will have your next dose if you have been recommended an injectable osteoporosis treatment.
- Be invited to meet healthcare professionals who can help you stay strong, steady and independent if you have fallen more than twice in the past 12 months, have injured yourself by falling, or your balance and the way you walk suggest you would benefit from specialist help.
- Understand when you next need to speak to a healthcare professional to review the osteoporosis medication recommended for you.
- Be asked how you are taking your osteoporosis medication, if you have any side effects or other problems taking it within 16, weeks and again within a year after your broken bone.

A member of FLS staff

You will:

- Discuss osteoporosis treatment options with the individual and provide information about the benefits, side effects and practical issues, to inform decision-making.
- Explain how the recommended treatment is taken and why these instructions are important.
- Explain when treatment will be reviewed and anticipated initial treatment duration.
- Explain what the person with osteoporosis should do if they have any difficulties or concerns about their medication and that other options are available if the first option is not tolerated.
- Refer to falls prevention services where appropriate.
- Follow-up with people within 16 weeks to check recommended treatment has been started.
- Follow-up with people at 52 weeks to check adherence to treatment.

The organisation

The organisation will:

- Have robust systems to ensure that people initiated on an injectable treatment receive the next dose at the right time.
- Ensure that the osteoporosis service has strong links and two-way referral protocols with the falls prevention services.
- Support processes to ensure patients on long-term therapy have treatment reviews in place.
- Regularly review the service to ensure that it is meeting the standards required.

Examples of audit and evidence

Bone therapy recommended
Percentage of patients who were recommended osteoporosis medication.

- Numerator – number of people recommended an osteoporosis treatment.
- Denominator – total number of people seen by the FLS.

Monitoring contact within 16 weeks post fracture

Percentage of patients who were recommended osteoporosis medication.

- Numerator – number of people followed-up by the FLS within 16 weeks of their fracture.
- Denominator – total number of people seen by the FLS.

Commenced osteoporosis drug treatment by first follow-up
Percentage of patients who had commenced (or were continuing) an osteoporosis medication.

- Numerator – number of people indicating that treatment had started during their 16-week follow-up.
- Denominator – total number of people seen by the FLS/ or number of people followed-up by the FLS by 16 weeks.

Strength and balance training
Percentage of non-hip fracture patients who had attended a strength and balance class within 16 weeks of their fracture

- Numerator – number of people who had attended a strength and balance class within 16 weeks of their fracture
- Denominator – number of non-hip fracture patients seen by the FLS/ or number of people followed up by the FLS by 16 weeks/ or number of non-hip fracture patients referred to the falls prevention service.

Monitoring contact at 52 weeks post fracture
Percentage of patients who were followed up at 52 weeks following their fracture.

- Numerator – number of people followed-up by the FLS at 52 weeks of their fracture.
- Denominator – total number of people seen by the FLS.

Adherence to prescribed anti-osteoporosis medication at 52 weeks post fracture
Percentage of patients who confirmed adherence to a prescribed osteoporosis medication at 52 weeks post fracture.

- Numerator – number of people indicating that they are taking medication correctly as prescribed during their 52-week follow-up.
- Denominator – total number of people seen by the FLS, or number of people followed-up by the FLS by 16 weeks.

Rate of prescribed medicines in primary care
per 1,000 people aged 50 and over.

Integrate

Standard 5: The FLS will integrate with the wider healthcare system to facilitate an inclusive patient pathway; ensuring effective case finding, onward referrals and long-term management of osteoporosis.

Rationale

An FLS can be based either in-hospital or out-of-hospital and may be delivered as virtual or hybrid service. Regardless of healthcare setting, in order to be effective, the FLS will be integrated with other services and the wider fracture prevention care pathway. This enables an FLS to maximise case finding, refer to appropriate services to meet a patient's needs and ensure transfer of care to facilitate long-term management of osteoporosis.

Osteoporosis drug treatments need to be taken correctly for long periods to gain maximum benefit. Ensuring good communication amongst healthcare professionals delivering fracture preventative care enables long-term support for patients to maximise treatment adherence and benefits.

Criteria

5.1. FLS correspondence with GP clearly indicates any actions requested of primary care, the recommended SNOMED codes and specifies whether the patient has received drug 'counselling' to prevent gaps or duplicate care delivery.

5.2. Clear management plans are prepared to facilitate transfer of care enabling the long-term management of osteoporosis in primary care.

5.3. The FLS staff maintain relationships with relevant in-hospital services.

5.4. The FLS staff have a good understanding of the available out-of-hospital services and how people using the FLS can access these.

5.5. Referral pathways between the FLS and relevant services are agreed.

5.6. FLS staff participate in a local multidisciplinary fracture prevention interest group that meets regularly to co-ordinate, plan and develop the FLS.

In Practice

Case finding

To identify people aged 50 years or older, an FLS will maintain relationships with relevant in-hospital services. As a minimum, the FLS should establish ways of working with:

- Emergency department
- Fracture clinic
- Orthopaedic and trauma department
- Radiology department

Where the FLS identifies a person who has fractured while away from their normal place of residence (known as 'out of area'), processes will be put in place to ensure that the person's GP and the FLS in their area are informed.

Referrals to meet patients' needs

Contact with an FLS presents an opportunity for associated health needs to be considered. This should be tailored for the individual and may include referral for anabolic treatment where indicated (unless it can be offered within the FLS), to other services such as falls prevention, pain management, physiotherapy, mental health, and other services that support patients with lifestyle changes.

Management plans and long-term management of osteoporosis

Long-term treatment of osteoporosis will be managed by the GP. Clear management plans from the FLS will outline the recommendations for treatment and review timescales. The FLS report will support transfer of care and long-term management of osteoporosis to the patient's primary care team. A report template will be created with input from the primary care team and patients, and feedback should be invited to ensure

the report meets their needs. Inclusion of the following information is recommended:

- Personal information and unique identifier.
- Details of fragility fracture(s).
- Current osteoporosis drug treatment.
- Results of assessments including fracture risk assessment, BMD results and laboratory tests.
- Management recommendations including treatment changes, recommended review dates and circumstances for re-referral.
- Appropriate primary care codes including the fracture site and type of fracture (e.g. osteoporotic), treatment initiated and onward referral (e.g. to falls service).

While the FLS will carry out initial follow-up contact by 16 weeks and at 52 weeks, further annual reviews should be completed outside of the FLS. How this is done in practice will depend on local capability and capacity. Examples include via a GP, another member of the primary care team or a community pharmacist. It can be carried out as part of a medication usage review, at a face-to-face appointment, by questionnaire, text or over the telephone.[65,66]

A reassessment of fracture risk will be carried out by the GP or by referral to the osteoporosis service at three years (for intravenous zoledronic acid or denosumab) or five years (for oral bisphosphonate) to determine whether it is appropriate to continue osteoporosis drug treatment or take a treatment pause. Denosumab treatment should only be discontinued after advice from a specialist in bone metabolism. A description of the process around this is given in NOGG guidance.[32]

When a pause in drug therapy is used as part of the treatment schedule for bisphosphonates, it is important that people have sufficient calcium and vitamin D and, at the end of this pause, they either automatically restart osteoporosis drug treatment or are reassessed to determine whether osteoporosis drug treatment should be reinstated. A fragility fracture during this treatment pause will be considered an indication to restart treatment, possibly with an alternative medication/ formulation.

Fracture prevention interest group

Regular virtual or face-to-face meetings of a fracture prevention interest group are used to plan service development, provide peer support and facilitate the sharing of standardised, high-quality care. The group will be multidisciplinary and ideally multi-organisational, with representatives from all stakeholders in falls, bone health and fracture prevention and will include patient representatives. This will include commissioners and service managers as well as healthcare professionals from in-hospital and out-of-hospital services.

What this standard means to:

A person receiving care

You will:

- Be seen within an integrated FLS which has good links to other relevant services based in hospital and in the community.
- Experience seamless services for bone health and falls prevention.
- If appropriate, be invited to meet other healthcare professionals who can help you, for example a physiotherapist or pain relief specialist.
- Be referred by FLS to other clinical services (either in primary or secondary care) depending upon your clinical need.
- Have your response to treatment (including your risk of breaking a bone) reassessed after three or five years to check that your treatment is still right for you.

A member of FLS staff

You will:

- Prepare guidance for onward management that can be understood by the person who has sustained the fracture and facilitate transfer of their care to their primary care team.
- Have knowledge of local services that will support the person to recover from their fracture and reduce their risk of future fractures.
- Ensure that the FLS has effective communication links with relevant in-hospital and out-of-hospital services so that people can access other services that they might need.

The organisation

The organisation will:

- Support processes that allow seamless referrals across different services and healthcare settings.

Examples of audit and evidence

In-hospital case finding
Percentage of patients identified through liaison with each relevant in-hospital department.

- Numerator – number of patients identified from each in-hospital department.
- Denominator – total number of patients identified.

Number of onward referrals
Percentage of patients referred by the FLS to other relevant services in line with patients' needs.

- Numerator – number of patients referred by the FLS to each other relevant service.
- Denominator – total number of patients identified.

FLS reports
Percentage of GPs who are satisfied that the FLS reports meet their needs.

- Numerator – number of GPs who are satisfied with the FLS report.
- Denominator – number of GPs consulted.

Also consider compliments, complaints and queries.

Three-to-five-year osteoporosis treatment review
Percentage of people seen by the service who are already taking an osteoporosis drug treatment but have not had a treatment review at three to five years.

- Numerator – number of people who have exceeded three or five years of osteoporosis drug treatment without a treatment review.
- Denominator – number of people seen by the service who are already taking an osteoporosis drug treatment.

Fracture prevention interest group
Evidence of membership, attendance, agendas and minutes.

Quality

Standard 6: The FLS demonstrates clinical accountability, effective governance, professional development and ongoing service improvement.

Rationale

Leadership, governance, professional accountability and staff development are essential to providing an efficient, coordinated and consistent service that meets the needs of its patients.

To deliver high-quality care, staff will demonstrate the necessary professional competencies and will participate in CPD to maintain their knowledge.

Service improvement involves individual staff, work teams and organisations looking at how making changes to the way they work can help improve patient care by making services better. Regional variation in care is minimised through audit and peer support.

Criteria

6.1. A designated lead clinician is accountable for all components of the service.

6.2. The FLS is developed in line with a local falls and fracture prevention strategy.

6.3. Core data from people identified by the FLS is recorded on an operational database which is compatible and set up to integrate with national audit (such as FLS-DB).[67]

6.4. A quality assurance framework is in place which includes:

- A programme of continuous improvement including regular audits.
- Participation in relevant national audits such as the FLS-DB
- Peer review.
- Patient and carer experience measures.

6.5. All members of the FLS team have assessment of professional competencies and demonstrate continuing professional development (CPD).

6.6. Staff are active participants in a regional clinical or professional network.

In practice

Accountability and governance

Clear lines of responsibility support effective healthcare delivery. There should be a designated clinical lead responsible for improvement and ensuring that all components of the service are connected. Agreed indicators will be monitored regularly and reported to commissioners or service managers. Each FLS should ensure that risks are identified, managed or escalated according to local risk management protocols.

Service improvement

The following elements of a quality assurance framework will be put in place to continually improve the FLS.

Strategy: Working with the fracture prevention interest group (see **Integrate**), a fracture prevention strategy will provide a roadmap for development and improvement of the service.

Operational database: An operational database is a necessity for any FLS. Efficient databases reduce the administration burden and store data in a form that can be exported for audit and reporting purposes. The database should record:

- Patient identification.
- Investigation of bone health.
- DXA.
- Falls risk.
- Treatment initiation/recommendation.
- Referrals to other services, e.g. falls prevention.
- Monitoring treatment concordance at 16- and 52-weeks post-fracture.

Any data collection tool may potentially be used as the basis of the database. Whatever IT solution is put in place, it must work in line with local NHS e-Health strategies and integrate with other clinical

IT applications (such as patient administration, DXA scanning and laboratories). It is also helpful if data can be extracted for national audit purposes (see below) where applicable.

Audit: The service will put in place an audit programme which is incorporated in local governance processes to measure its performance against these standards.

For sites in England, Wales, and Northern Ireland, a detailed dataset of core questions is provided by the Fracture Liaison Service Database (FLS-DB). The FLS-DB provides site specific feedback to inform service improvement and national benchmarking. The dataset within the FLS-DB is based on nationally assured documents such as NICE and SIGN guidance as well as these standards.

Through engagement in available national audits, a greater understanding of secondary fracture prevention can be achieved, and standards improved to ensure consistently high quality of care.

For services that are not subject to national audit, international audits may be used to benchmark organisational-level performance against international standards for FLS.[26]

Key performance indicators: Commissioners and service planners will work with providers to identify key performance indicators (KPI) by which to monitor the quality and impact of the FLS. Aligning local quantitative measures of performance with the national audit dataset is recommended. This means data can be captured once and effectively used for multiple purposes. A list of recommended KPIs is included in the FLS Toolkit (see **Implementing the FLS Standards** for more information).

Peer review: Peer review is offered by some professional bodies, or it may be organised informally between sites with an FLS. Regardless of the approach used, it should bring stakeholders together to assess clinical care against agreed standards and ensure that clinical teams' voices are heard and help shape the future delivery of the service. Peer review is beneficial to all participants, allowing time for reflection, problem solving and sharing of good practice. It also addresses agendas of clinical governance and revalidation.

Professional development

To provide safe and clinically effective care and management, it is recommended that all healthcare professionals within the FLS team maintain appropriate CPD to meet regulatory requirements. Various courses, conferences and meetings exist across the UK and beyond, which provide evidence-based knowledge on osteoporosis and secondary fracture prevention. Participation in a regional clinical or professional network is also a valuable tool for professional development and sharing of good practice.

The ROS has developed an online **Fracture Prevention Practitioner Training** course which aims to provide easily accessible training to establish a knowledge quality standard. Content includes modules on epidemiology of osteoporosis, fracture risk assessment, osteoporosis management, falls assessment and management and complex cases.

What this standard means to:

A person receiving care

You will:

- Receive good quality care that meets current guidance and reflects up-to-date practice from all the healthcare professionals you encounter.
- Receive care from motivated staff with the right knowledge and skills for their role.
- Be able to make informed decisions about your care.

A member of FLS staff

You will:

- Feel supported and motivated.
- Be able to demonstrate competencies relevant to your role.
- Have formal and informal opportunities to develop your knowledge and skills.
- Complete at least one data driven Quality Improvement cycle per year.
- Contribute to the local fracture prevention interest group by either: - Becoming a member, actively communicating with your colleagues to represent their views and keep them informed; or - Working with your representative.
- Be an active member of a regional clinical/professional network.
- Be an active member of national networks/meetings.
- Be able to question practice and discuss different approaches to care.

The organisation

The organisation will:

- Have networks in place to support the development of services and sharing of knowledge.
- Allow access to and support for a database that is specifically set up for the purposes of the FLS.
- Have an inclusive multidisciplinary fracture prevention interest group.
- Have a fracture prevention strategy that includes falls and bone health.
- Review the FLS performance and quality improvement within the organisations governance framework.
- Provide administrative support for upload to national audits.
- Have a professional accountability framework with clear lines of responsibility.
- Benchmark the service locally and nationally through engagement with national audit.

Examples of audit and evidence

Professional development
Percentage of FLS staff who have completed an accredited course or learning programme appropriate to their role.

- Numerator – Number of FLS staff who have completed an accredited learning programme appropriate to their role in the last 52 weeks.
- Denominator – Total number of FLS staff.

Percentage of FLS staff who have attended at least one regional or national meeting or workshop.

- Numerator – Number of FLS staff who have attended at least one regional or national meeting or workshop in the last 52 weeks.
- Denominator – Total number of FLS staff.

Patient Satisfaction with FLS
Annual patient satisfaction completed. Use as a baseline in year one and develop action plan with commissioners and service planners to address any issues.

Recording data
Data is recorded for local audit purposes and uploaded to national audit (where available).

Continuous improvement
Examples include: plan and execution of audit cycles and details of patient and public involvement in service improvement.

Implementing the FLS standards

Fracture Liaison Service (FLS) models vary based on local assets, service pathways, and health system priorities. However, by adopting UK FLS Clinical Standards, evidence-based best practices can be effectively implemented across the country.

Establishing a new FLS requires time and commitment. Since 2015, the Royal Osteoporosis Society (ROS) has supported FLS development through its Service Improvement (SI) team, which partners with NHS Trusts and Health Boards to:

- Support development of new FLS and improve existing services
- Support the development of FLS business cases
- Drive system-wide FLS transformation across Integrated Care Systems (ICS)
- Address variation in FLS provision to achieve cohesive, high-quality services

The SI team also assists with FLS event planning and engages with clinicians and commissioners to build support for FLS service development and service improvement.

Given current budget constraints, investment in new services must be evidence-led and cost efficient. To support this, ROS provides a comprehensive suite of free resources, including:

- **FLS Implementation Toolkit** – guides providers and commissioners through the commissioning and improvement process
- **FLS Cost-Benefit Tool** – estimates fractures prevented, financial savings, bed days released, staffing resources needed and implementation costs for your locality
- **FLS Business case resource** – guides clinicians and project managers through the development of the FLS business case, providing the latest evidence and national levers to support the case for FLS.

Additional support includes:

- Stakeholder engagement to secure long-term commitment
- End-to-end support from service inception to launch
- Business case development support and capacity planning
- Template job descriptions and adverts
- Fracture prevention practitioner training – foundation and advanced level
- Guidance on protocols and care pathways
- Quality improvement support, including gap analysis
- Advice on data collection, reporting, and evaluation
- Peer to peer support
- Support with recruitment of patient for co-production

All ROS services and tools are available free of charge to help health systems deliver high-quality FLS.

The FLS Implementation Toolkit is online at: **https://theros.org.uk/healthcare-professionals/clinical-quality-hub/fracture-liaison-services/implementation-toolkit**

Contact us:

Email: **FLS@theROS.org.uk**

References

1 van Staa TP, Dennison EM, Leufkens HG, Cooper C. Epidemiology of fractures in England and Wales. *Bone* 2001; **29**: 517–522.

2 Leal J, Gray AM, Prieto-Alhambra D, others. Impact of hip fracture on hospital care costs: a population-based study. *Osteoporos Int* 2016; **27**: 549–558.

3 Baji P, Patel R, Judge A, Johansen A, Griffin J, Chesser T *et al.* Organisational factors associated with hospital costs and patient mortality in the 365 days following hip fracture in England and Wales (REDUCE): a record-linkage cohort study. *Lancet Healthy Longev* 2023; **4**: e386–e398.

4 Scottish Government. Scottish Hip Fracture Audit. https://scotland.shinyapps.io/phs-scottish-hip-fracture-audit-2024/ (accessed 4 Dec2024).

5 Royal Osteoporosis Society (ROS). Life with Osteoporosis. 2021 https://theros.org.uk/how-you-can-help/campaign-with-us/life-with-osteoporosis-2021-the-untold-story/ (accessed 7 Jan2022).

6 Royal Osteoporosis Society. Analysis available upon request.

7 Department of Health. Falls and fractures: effective interventions in health and social care. 2009.

8 Gonnelli S, Caffarelli C, Maggi S, Rossi S, Siviero P, Gandolini G *et al.* The assessment of vertebral fractures in elderly women with recent hip fractures: The BREAK Study. *Osteoporos Int* 2013; **24**: 1151–1159.

9 Wu C-H, Kao I-J, Hung W-C, Lin S-C, Liu H-C, Hsieh M-H *et al.* Economic impact and cost-effectiveness of fracture liaison services: a systematic review of the literature. *Osteoporosis International* 2018; **29**: 1227–1242.

10 National Institute for Health and Care Excellence (NICE). Shared decision making [NICE guideline NG197]. 2021.www.nice.org.uk/guidance/ng197 (accessed 4 Aug 2022).

11 Royal Osteoporosis Society. Living with osteoporosis. https://theros.org.uk/information-and-support/osteoporosis/living-with-osteoporosis/ (accessed 4 Dec 2024).

12 Svedbom A, Hernlund E, Ivergård M, Compston J, Cooper C, Stenmark J *et al.* Osteoporosis in the European Union: a compendium of country-specific reports. *Arch Osteoporos* 2013; **8**: 137.

13 The International Osteoporosis Foundation. Broken Bones, Broken Lives: A roadmap to solve the fragility fracture crisis in the United Kingdom. 2018.

14 Kanis JA, Norton N, Harvey NC, Jacobson T, Johansson H, Lorentzon M *et al.* SCOPE 2021: a new scorecard for osteoporosis in Europe. *Arch Osteoporos* 2021; **16**. doi:10.1007/S11657-020-00871-9.

15 Royal College of Physicians. National Hip Fracture Database Annual Report. London, 2018https://www.nhfd.co.uk/.

16 Klotzbuecher CM, Ross PD, Landsman PB, Abbott TA, Berger M. Patients with Prior Fractures Have an Increased Risk of Future Fractures: A Summary of the Literature and Statistical Synthesis. *Journal of Bone and Mineral Research* 2000; **15**: 721–739.

17 Kanis JA, Johnell O, De Laet C, Johansson H, Oden A, Delmas P *et al.* A meta-analysis of previous fracture and subsequent fracture risk. *Bone* 2004; **35**: 375–382.

18 Hansen L, Petersen KD, Eriksen SA, Langdahl BL, Eiken PA, Brixen K *et al.* Subsequent fracture rates in a nationwide population-based cohort study with a 10-year perspective. *Osteoporosis International* 2015; **26**: 513–519.

19 Haentjens P, Johnell O, Kanis JA, Bouillon R, Cooper C, Lamraski G *et al.* Evidence From Data Searches and Life - Table Analyses for Gender - Related Differences in Absolute Risk of Hip Fracture After Colles' or Spine Fracture: Colles' Fracture as an Early and Sensitive Marker of Skeletal Fragility in White Men*. *Journal of Bone and Mineral Research* 2004; **19**: 1933–1944.

20 Johnell O, Kanis JA, Odén A, Sernbo I, Redlund-Johnell I, Petterson C *et al.* Fracture risk following an osteoporotic fracture. *Osteoporosis International* 2004; **15**: 175–179.

21 van Geel TA, van Helden S, Geusens PP, Winkens B, G.J. D. Clinical subsequent fractures cluster in time after first fractures. Ann Rheum Dis 2009; **68**: 99–102.

22 FLS-DB starter pack | RCP. (n.d.). Retrieved June 17, 2025, from https://www.rcp.ac.uk/improving-care/national-clinical-audits/falls-and-fragility-fracture-audit-programme-fffap/fls-db-starter-pack/

23 Capture the Fracture. Best Practice Framework Questionnaire [Internet]. Nyon: International Osteoporosis Foundation; [cited 2025 May 12]. Available from: https://www.capturethefracture.org/best-practice-framework-questionnaire

24 Javaid MK, Sami A, Lems W, Mitchell P, Thomas T, Singer A, et al. A patient-level key performance indicator set to measure the effectiveness of fracture liaison services and guide quality improvement: a position paper of the IOF Capture the Fracture Working Group, National Osteoporosis Foundation and Fragility Fracture Network. Osteoporosis Int. 2020; 31: 1193–1204

25 National Institute for Health and Care Excellence (NICE). Falls in Older People: assessing risk and prevention. NICE clinical guideline [CG 161]. 2013.

26 National Institute for Health and Care Excellence (NICE). Raloxifene and teriparatide for the secondary prevention of osteoporotic fragility fractures in postmenopausal women. Technology appraisal guidance [TA 161]. 2008 https://www.nice.org.uk/guidance/ta160 (accessed 7 Aug 2022).

27 National Institute for Health and Care Excellence (NICE). Osteoporosis Quality standard [QS149]. 2017 https://www.nice.org.uk/guidance/qs149 (accessed 6 Jan 2022).

28 National Institute for Health and Care Excellence (NICE). Osteoporosis: assessing the risk of fragility fracture. Clinical Guideline [CG 146]. 2012. www.nice.org.uk/guidance/cg146.

29 National Institute for Health and Care Excellence (NICE). Bisphosphonates for treating osteoporosis. Technology appraisal guidance [TA 464]. 2019. https://www.nice.org.uk/guidance/ta464.

30 National Institute for Health and Care Excellence (NICE). Denosumab for the prevention of osteoporotic fractures in postmenopausal women. Technology appraisal guidance [TA 204]. 2010. https://www.nice.org.uk/Guidance/TA204 (accessed 24 May 2022).

31 Scottish Intercollegiate Guidelines Network (SIGN), Healthcare Improvement Scotland. SIGN142. Management of osteoporosis and the prevention of fragility fractures - A national clinical guideline. 2020. https://www.sign.ac.uk/media/1741/sign142.pdf (accessed 14 Jan 2022).

32 National Osteoporosis Guideline Group (NOGG). Clinical guideline for the prevention and treatment of osteoporosis. 2021. https://www.nogg.org.uk/full-guideline (accessed 24 Feb 2024).

33 Scottish Government. Realistic Medicine - Taking Care: Chief Medical Officer for Scotland annual report 2023 to 2024. 2024 https://www.gov.scot/publications/realistic-medicine-taking-care-chief-medical-officer-scotland-annual-report-2023-2024/ (accessed 27 Nov 2024).

34 Welsh Government, NHS Wales. Prudent Healthcare. Securing Health and Well-being for Future Generations. 2016 https://www.gov.wales/sites/default/files/publications/2019-04/securing-health-and-well-being-for-future-generations.pdf (accessed 2 Dec 2024).

35 Welsh Government. A Healthier Wales: our Plan for Health and Social Care. 2021 https://www.gov.wales/sites/default/files/publications/2021-09/a-healthier-wales-our-plan-for-health-and-social-care.pdf (accessed 2 Dec 2024).

36 Welsh Government. Quality statement for osteoporosis and bone health. 2024. https://www.gov.wales/quality-statement-osteoporosis-and-bone-health-html (accessed 7 Dec 2024).

37 NHS England. Making Every Contact Count - elearning for healthcare. https://www.e-lfh.org.uk/programmes/making-every-contact-count/ (accessed 27 Nov 2024).

38 NHS England. Musculoskeletal (MSK) portfolio - Getting It Right First Time - GIRFT. https://gettingitrightfirsttime.co.uk/academy-resources/musculoskeletal-msk-portfolio/ (accessed 26 Nov 2024).

39 Johansson H, Siggeirsdóttir K, Harvey NC, Odén A, Gudnason V, McCloskey E et al. Imminent risk of fracture after fracture. Osteoporosis International 2017; **28**: 775–780.

40 Royal Osteoporosis Society (ROS). Clinical Guidance for the effective identification of vertebral fractures. 2017. https://scholar.google.co.uk/scholar?hl=en&as_sdt=0%2C5&q=+Clinical+Guidance+for+the+effective+identification+of+vertebral+fractures.+&btnG= (accessed 7 Jan 2022).

41 The Ionising Radiations Regulations 2017. 2017 https://www.legislation.gov.uk/uksi/2017/1075/contents/made (accessed 16 Mar 2024).

42 The Ionising Radiations Regulations (Northern Ireland) 2017. The Stationery Office: London: UK, 2017 https://www.legislation.gov.uk/nisr/2017/229 (accessed 19 Oct 2024).

43 The Ionising Radiation (Medical Exposure) Regulations 2017. The Stationery Office: London: UK, 2017 https://www.legislation.gov.uk/uksi/2017/1322/contents/made (accessed 26 Jun 2023).

44 Department of Health and Social Care. Guidance to the Ionising Radiation (Medical Exposure) Regulations 2017. 2018. www.nationalarchives.gov.uk/doc/open-government-licence/ (accessed 19 May 2023).

45 The Ionising Radiation (Medical Exposure) (Amendment) Regulations 2024. The Stationery Office: London: UK, 2024.

46 The Ionising Radiation (Medical Exposure) (Amendment) Regulations 2018. The Stationery Office: London: UK, 2018 https://www.legislation.gov.uk/uksi/2018/121/contents/made (accessed 30 Aug 2023).

47 The Ionising Radiation (Medical Exposure) Regulations (Northern Ireland) 2018. The Stationery Office: London: UK, 2018 https://www.legislation.gov.uk/nisr/2018/17/contents/made (accessed 19 Oct 2024).

48 International Society for Clinical Densitometry. ISCD Official Positions - Adult. 2019. https://iscd.org/learn/official-positions/adult-positions/ (accessed 25 Feb 2024).

49 Medicines and Healthcare products Regulatory Agency. Drug Safety Update: Volume 13, Issue 3, October 2019 [Internet]. London: MHRA; 2019 [cited 2025 May 14]. Available from: https://assets.publishing.service.gov.uk/media/5da9bde040f0b6598ec848fd/Oct-2019-PDF.pdf

50 Cummings SR, Eastell R, Ferrari S, Giangregorio L, Harvey N, Kanis JA, et al. Updated consensus on the use of bone turnover markers in osteoporosis: The IOF-ESCEO-IFCC Working Group recommendations. Osteoporos Int. 2025;36(1):1–19.

51 World Falls Guidelines. https://worldfallsguidelines.com/ (accessed 14 Dec 2024).

52 National Institute for Health and Care Excellence (NICE). Medicines adherence: involving patients in decisions about prescribed medicines and supporting adherence. Clinical guideline [CG76]. National Institute for Health and Care Excellence. 2009. https://www.nice.org.uk/guidance/cg76 (accessed 6 Jan 2022).

53 Bullock L, Crawford-Manning F, Cottrell E, Fleming J, Leyland S, Edwards J et al. Developing a model Fracture Liaison Service consultation with patients, carers and clinicians: a Delphi survey to inform content of the iFraP complex consultation intervention. Arch Osteoporos 2021; **16**: 1–17.

54 Bullock L, Abdelmagid S, Fleming J, Leyland S, Clark EM, Gidlow C et al. Variation in UK fracture liaison service consultation conduct and content before and during the COVID pandemic: results from the iFraP-D UK survey. Arch Osteoporos 2023; **19**. doi:10.1007/S11657-023-01361-4.

55 Royal Osteoporosis Society. Guidance for the management of sympomatic vertebral fragility fractures. Bath, 2022 https://strwebprdmedia.blob.core.windows.net/media/x0hffxye/ros-guidance-on-managing-symptoms-of-vertebral-fractures-2022.pdf (accessed 14 Dec 2024).

56 Keele Osteoporosis Research Group. iFraP/Osteoporosis Options Advanced Consultation Skills training. Available at: Osteoarthritis and Osteoporosis - Keele University.

57 National Institute for Health and Care Excellence (NICE). Romosozumab for treating severe osteoporosis. Technology appraisal guidance [TA 791]. 2022. https://www.nice.org.uk/guidance/ta791 (accessed 24 Feb 2024).

58 National Institute for Health and Care Excellence (NICE). Abaloparatide for treating osteoporosis after menopause [TA991]. 2024. https://www.nice.org.uk/guidance/TA991 (accessed 7 Dec 2024).

59 Chapuy MC, Arlot ME, Delmans PD, Meunier PJ. Effect of calcium and cholecalciferol treatment for three years on hip fractures in elderly women. BMJ : British Medical Journal 1994; **308**: 1081.

60 Centre for Genomic and Experimental Medicine, University of Edinburgh. CGEM Calcium Calculator. https://webapps.igc.ed.ac.uk/world/research/rheumatological/calcium-calculator/ (accessed 7 Dec 2024).

61 Royal Osteoporosis Society. Vitamin D and Bone Health: A Practical Clinical Guideline for Patients. The Quick Guide. 2020. https://theros.org.uk/media/5imnumtq/ros-vitamin-d-quick-guide-november-2018.pdf (accessed 7 Dec 2024).

62 Royal Osteoporosis Society. Vitamin D and Bone Health: A Practical Clinical Guideline for Patient Management. 2020. https://strwebprdmedia.blob.core.windows.net/media/ef2ideu2/ros-vitamin-d-and-bone-health-in-adults-february-2020.pdf (accessed 7 Dec 2024).

63 Black DM, Cummings SR, Karpf DB, others. Randomised trial of effect of alendronate on risk of fracture in women with existing vertebral fractures. Fracture Intervention Trial Research Group. Lancet 1996; **348**: 1535–1541.

64 Royal Osteoporosis Society. Strong, Steady and Straight; An Expert Consensus Statement on physical activity and exercise for osteoporosis. 2018 https://theros.org.uk/media/0o5h1l53/ros-strong-steady-straight-quick-guidefebruary-2019.pdf.

65 Elliott RA, Barber N, Clifford S, Horne R, Hartley E. The cost effectiveness of a telephone-based pharmacy advisory service to improve adherence to newly prescribed medicines. Pharmacy World and Science 2008; **30**: 17–23.

66 Thakkar J, Kurup R, Laba TL, Santo K, Thiagalingam A, Rodgers A et al. Mobile Telephone Text Messaging for Medication Adherence in Chronic Disease: A Meta-analysis. JAMA Intern Med 2016; 176: 340–349.

67 Royal College of Physicians. Fracture Liaison Service Database (FLS-DB). https://www.rcplondon.ac.uk/projects/fracture-liaison-service-database-fls-db (accessed 19 Jan 2022).

68 Royal College of Physicians. Strong bones after 50: FLS explained. A guide for patients, carers and families. 2018. https://www.rcp.ac.uk/improving-care/national-clinical-audits/falls-and-fragility-fracture-audit-programme-fffap/fracture-liaison-service-database-fls-db/strong-bones-after-50-fracture-liaison-services-explained/ (accessed 2 Dec2024).

Appendix 1:
Abbreviations and definition of terms

Community care	Health services you receive close to your home or in your home, for example, health visiting, physiotherapy or speech and language therapy.
DXA	Dual energy X-ray absorptiometry: The technique used to measure bone density and diagnose osteoporosis.
FLS	Fracture Liaison Service: A service which systematically identifies, treats and refers to appropriate services all eligible patients aged 50 and older within a local population who have suffered fragility fractures, with the aim of reducing their risk of subsequent fractures.
Fragility Fracture	A broken bone (fracture) resulting from a low impact, such as a fall from standing height or less.
FRAX®	An online diagnostic tool used to evaluate the 10-year probability of fracture risk.
In-hospital services	Healthcare provided in a hospital setting.
IOF	International Osteoporosis Foundation
NICE	National Institute for Health and Care Excellence
NOGG	National Osteoporosis Guideline Group
Out-of-hospital services	Any healthcare provided in a setting other than a hospital.
Patient presentation	In medical terms, to present with' refers to the symptoms, signs or conditions that a patient displays or reports during a medical consultation.
Primary care	The advice and treatment you receive from your local GP.
QFracture®	An online calculator used to estimate an individual's risk of developing hip fracture or osteoporotic fracture (hip, spine, wrist or shoulder) over 10 years.
SIGN	Scottish Intercollegiate Guidelines Network
VFA	Vertebral Fracture Assessment: The technique used to assess the presence of prevalent vertebral fractures as performed as part of a DXA assessment.

About us

The Royal Osteoporosis Society is the UK's largest national charity dedicated to improving bone health and beating osteoporosis.

We equip people with practical information and support to take action on their bone health. Working with healthcare professionals and policy-makers, we influence and shape policy and practice at every level and invest in research.

To find out more visit our website: **theros.org.uk**

Professional Membership

Join us as a professional member and help us to support more people with osteoporosis.

Call our membership team on **01761 473287** or visit **theros.org.uk/healthcare-professionals** to find out more about the benefits of professional membership.

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