



Fracture Liaison Service Database (FLS-DB) clinical audit

FLS forward: Identifying high-quality
care in the NHS for secondary
fracture prevention

April 2017

In association with:

Commissioned by:



British Geriatrics Society
Improving healthcare
for older people



FLS forward: Identifying high-quality care in the NHS for secondary fracture prevention

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Falls and Fragility Fracture Audit Programme

The FLS-DB is commissioned by the Healthcare Quality Improvement Partnership (HQIP) and managed by the Royal College of Physicians (RCP) as part of the Falls and Fragility Fracture Audit Programme (FFFAP), alongside the National Audit of Inpatient Falls and the National Hip Fracture Database. FFFAP aims to improve the delivery of care for patients who have falls or sustain fractures through effective measurement against standards and feedback to providers.

Healthcare Quality Improvement Partnership

The Healthcare Quality Improvement Partnership (HQIP) is led by a consortium of the Academy of Medical Royal Colleges, the Royal College of Nursing and National Voices. Its aim is to promote quality improvement, and in particular to increase the impact that clinical audit has on healthcare quality in England and Wales. HQIP hosts the contract to manage and develop the National Clinical Audit and Patient Outcomes Programme (NCAPOP). Its purpose is to engage clinicians across England and Wales in systematic evaluation of their clinical practice against standards and to support and encourage improvement in the quality of treatment and care. The programme comprises more than 30 clinical audits that cover care provided to people with a wide range of medical, surgical and mental health conditions.

The Royal College of Physicians

The Royal College of Physicians (RCP) is a registered charity that aims to ensure high-quality care for patients by promoting the highest standards of medical practice. It provides and sets standards in clinical practice, education and training; conducts assessments and examinations; quality assures external audit programmes; supports doctors in their practice of medicine; and advises the government, the public and the profession on healthcare issues.

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Document purpose	To disseminate results on the quality of service provision for secondary fracture prevention in England and Wales and highlight areas for improvement.
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Description	This report provides the first ever benchmark for the performance of FLSs at the patient level and is the next step in understanding current secondary fracture prevention care in England and Wales.
Related publications	<ul style="list-style-type: none">• <i>Fracture Liaison Service Database (FLS-DB) facilities audit. FLS breakpoint: opportunities for improving patient care following a fragility fracture.</i> London: RCP, 2016.• <i>Secondary fracture prevention: first steps to a national audit. Fracture Liaison Service Database (FLS-DB): feasibility study summary report.</i> London: RCP, 2015.• <i>Falling standards, broken promises: Report of the national audit of falls and bone health in older people 2010.</i> London: RCP, 2011.• <i>Effective secondary prevention of fragility fractures: clinical standards for fracture liaison services.</i> National Osteoporosis Society, 2015.
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Foreword by National Osteoporosis Society



As chief executive of the National Osteoporosis Society (NOS), the only UK-wide charity that supports people with osteoporosis and their carers, I am delighted to provide the foreword for the first Fracture Liaison Service Database (FLS-DB) audit report on patient data in England and Wales. We share the same ambition to drive quality improvement in the identification and management of fragility fractures and to support people with osteoporosis and their carers.

This audit serves to monitor the standard of care being delivered to patients, as well as providing a wealth of data to all those interested in improving the care of people with osteoporosis and fragility fractures. The report will provide a new impetus to transform services to meet the NOS national standards and therefore to better identify, assess and treat people with osteoporosis. The information in this report will help individual NHS trusts to focus on areas that will see the greatest benefit to their patients and ensure that they provide the care and support that people with osteoporosis need.

Drilling down to individual cases illuminates the myriad of complex and sometimes lengthy routes that patients with a fragility fracture face from fracture to treatment. Ultimately, along with all those working in secondary fracture prevention, we hope that this report can reinforce best practice in fragility fracture identification and management. At our charity, we understand the enormous impact of osteoporosis, and how best practice in fracture prevention represents the best opportunity to prevent the pain and loss of quality of life that each fragility fracture entails.

I hope that by making the information accessible in this way, the patient audit report will inform people with osteoporosis about the level of care that they are entitled to and can be used to push for change nationally and locally where necessary.

A handwritten signature in black ink, reading 'C Severgnini'.

Claire Severgnini

Chief executive, National Osteoporosis Society

Patient perspectives

Experiencing a fracture liaison service at its best

Having carelessly tripped on a pavement and cracked ribs, I subsequently, a couple of months later, slipped backwards on a wet floor, resulting in admission to James Cook Hospital with a suspected punctured lung and further broken ribs. Just under 90 days following my discharge, I received an appointment to attend for a DXA scan. This came as a surprise, but at that time I viewed this as perhaps the norm but was impressed with the 'follow-up'.

Within days of the scan, I was again surprised when I receive a phone call to arrange an appointment at a local fracture liaison service (FLS) clinic and was seen within the week. Having recently retired, I was full of 'vim and vigour', had joined a gym and was eager to enter the next chapter of freedom and activity with relish. In this frame of mind, I bounded in to see the FLS nurse who explained the severity of the results, particularly with respect to my spine. This came as a shock, but I felt that I was given comprehensive and measured information and my treatment was fully explained, as was the future role of my GP in prescribing the medication. Contact with NOS was recommended, and open contact to the FLS clinic should I have any concerns.

Over the next couple of months, as winter approached and icy pavements became increasingly slippery, I aged mentally by about 20 years. Becoming anxious about falls and spinal fractures, I cancelled the gym and was overly cautious regarding mobility. I was guilty, also, of not adhering to the treatment. A timely phone call from the FLS nurse, who had determined from my records that I had not continued to pick up my prescriptions, set me back on track, together with further discussions about the NOS. This was sound advice, as I was able to search out information regarding lifestyle and particularly exercise, and I was soon able to readdress the imbalance in my life. I have become increasingly involved with the local NOS support group, which both the FLS nurse and consultant visit regularly with medical updates and question and answer sessions. (I have also shed those 20 years.) I believe the trust I have in this FLS to be fundamental in my psychological approach to living with osteoporosis.

Through this experience, I became aware of how lucky I had been to live within the 'catchment' of an excellent FLS and to benefit from an early diagnosis, and how close I had come to a spinal injury. This scenario would not have been the same in all parts of the country. Having a background in health education and advocacy, I was keen to take on a role as a volunteer nationally with the NOS.

Sadly, I have continued to have blips with adherence, but at each stage the FLS nurse has been there to conduct routine monitoring to discuss problems with side effects of the treatment, and to research these side effects and make referrals to the consultant, who reviews my medication yearly.

How fortunate I have been, but I believe passionately that this should not be 'fortune'. All patients deserve a service such as the standard that has been provided by this health trust, which has been prepared to prioritise and provide better outcomes for its patients.

Alison Smith

Patient user group

FLSs are a clear example of an initiative that benefits both the health service and patients. There is a need for greater public awareness of the importance and role of FLSs. There is also a requirement for patient engagement and straightforward, appropriate patient information that reflects what these services offer. Therefore, we welcome this important audit, which highlights a previously neglected issue and potentially raises public awareness. We believe that FLSs should be compulsory and that participation in the audit should be mandatory.

This audit should be the gateway to proactively improving data collection, healthcare and overall wellbeing of local communities. For example, the report highlights the key benefits of telephone follow-up. However, the audit findings also reflect very variable data and we believe that this requires further investigation. In particular, we are disappointed to see the low number of people who are evidenced in the report as having a falls assessment. We agree with the key recommendation that units which consistently demonstrate good practice should be used as exemplars to facilitate the improvement of other FLSs. All FLSs should continue to work closely with patients to increase their engagement. We look forward to future results from this audit programme. We hope that it will evidence much-needed improvements nationally in the quality of provision.

Keele University Research User Group (part of the Research Institute for Primary Care and Health Sciences)

Executive summary

The highest treatment rate of any FLS was 51%. If all fracture patients in England received a comparable service, we estimate that 21,848 fractures would be prevented over 5 years (up to 2020), including 9,157 hip fractures. The prevention of hip fractures alone would be expected to lead to a saving of over £151 million over the same period.*

We are grateful for the hard work of many NHS professionals in England and Wales who have contributed to a very high return rate for the audit, and recognise that the findings of this audit will be challenging for many FLSs. The aim of this audit is to stimulate quality improvement to ensure that each FLS in the NHS is effective and delivers its service efficiently.

Introduction

There are an estimated half a million fragility fractures in the UK each year – more than three times the annual number of strokes.¹ Fragility fractures are a major clinical event for patients, their families and carers. The direct health costs of these fractures are estimated at £4.3 billion every year.¹ With an ageing population, absolute numbers of hip fractures are projected to increase by 65% in the next 20 years. National Institute for Health and Care Excellence (NICE)-approved medications significantly reduce the risk of the next fracture by 20–70% (depending upon fracture site). This is a substantial reduction in risk.

There is a crisis in osteoporosis care; the estimated number of avoidable fractures every year is in the thousands. If more patients were treated after a fragility fracture, many of these fractures could be avoided. All eligible patients receiving effective secondary fracture prevention would provide a real benefit to people in the UK, with almost 54,000 fractures prevented in the first 5 years.²

An FLS aims to reduce the risk of subsequent fractures by systematically identifying, treating and referring to appropriate services all eligible patients aged 50 and over who have suffered a fragility fracture.

Methodology

The audit was initiated to measure primarily against NICE technology assessments and guidance on osteoporosis, and the NOS clinical standards for FLSs.^{3–8} All FLSs in England and Wales were eligible to participate. In total, 38 FLSs submitted the data that are included in this report. The full methodology can be found in Appendix B.

Key findings

- 1 In this first national patient-level audit of the quality of FLSs in the world, there has been a fantastic response, with over 18,356 patients entered from 38 FLSs. The audit demonstrates clear areas for improvement in order for FLSs to develop greater effectiveness and efficiency, leading to sustainable funding.
- 2 National coverage of secondary fracture prevention using FLSs is still low.
- 3 The variability in quality between existing FLSs highlights the need for continuous national audit of secondary fracture prevention. This audit has demonstrated that FLS audit participation is achievable and should act as a quality standard for an FLS.

*All benefits are gross and do not take account of costs of FLS provision. All benefits are calculated compared with usual care.

- 4 There was variability in the completeness of submitted data. Only 14 FLSs submitted more than 80% of (29) fields with less than 20% missing data.
- 5 There was marked variability in the proportion of patients meeting recognised standards of care in the following areas:
 - a identification of fragility fracture patient caseload
 - b timely initial contact and subsequent risk assessment for fracture patients
 - c treatment initiation and monitoring.

This audit provides the first ever benchmarks for the performance of FLSs at the patient level. There are a number of FLSs meeting agreed national and international quality standards of secondary fracture prevention, proving that these standards are achievable. Importantly, many FLSs are not yet meeting the key quality standards and this audit provides the data to support local quality improvement plans so that, by the next audit, they can demonstrate significant improvement. This project is in a developmental stage, and one of the main aims of this report is to encourage future participation in the audit from both existing and newly commissioned FLSs.

Key recommendations

FLSs that participated in the report should:

- be congratulated for their wish to evaluate and improve the patient service that they offer
- review their own service's performance within this report and develop effective quality improvement plans to improve quality and efficiency of patient care or of service
- ensure that patients presenting with a hip fracture are included in the FLS-DB, as they are at very high risk of another fracture and current audits have limited measures for the quality of bone assessment⁹
- develop closer working between primary, community and secondary care services to help facilitate effective management plans and to support patients to understand the importance of ongoing steps to minimise fracture risk, including adherence to anti-osteoporosis medication
- review their performance using their own live run charts, which are available on the FLS-DB webtool (<http://fffap.org/fls/flsweb.nsf>)
- participate in the FLS-DB audit continuously to measure key quality aspects of their service
- provide constructive feedback to the FLS-DB audit team (flsdb@rcplondon.ac.uk), so that we can improve the audit over the years to come
- ensure that, as a minimum, they collect the audit dataset within their local pathway and then work to improve FLS-DB data submission by the next data cut-off of June 2017.

FLSs that did not participate in the report and services without an FLS should:

- review opportunities regarding data entry options, and discuss approaches with other, well-performing FLSs
- contact FLSs that did participate and NOS for advice on how to develop and improve the services offered by an FLS.

Chief executives and hospital trust boards should:

- support their FLS's work for quality improvement to develop and improve the FLS's services and engagement with the audit
- recognise that secondary fracture prevention provides a great opportunity to improve integration across clinical service areas to provide a genuinely patient-centred approach.

Commissioners and local health boards should:

- review the audit's findings. Those clinical commissioning groups (CCGs) without an FLS should actively support a project plan so that they can implement a service in 2017/18
- contact other CCGs with effective FLSs and the NOS for support in developing strategies to establish new FLSs
- consider aligning the key performance indicators for their FLS(s) with those of the audit run charts to reduce duplication and improve transparency.

Full recommendations

An FLS should:

- **identify** all patients aged 50 years and over with a new fragility fracture
- **investigate** underlying causes of secondary osteoporosis and falls risks
- **intervene** and recommend treatment for sustaining a reduction in secondary fracture risk and falls
- **monitor** to ensure long-term treatment adherence among patients as part of an integrated service.

Identification

- FLSs should review their pathways so that there is a local process to identify all patients aged 50 years and over with a new fragility fracture, including hip fracture patients and those with newly reported vertebral fractures.
- FLSs should review or process-map their pathway for patient identification, and liaise with FLSs of a similar estimated fragility fracture caseload to develop local quality improvement project plans within a realistic timescale.
- FLSs that are not able to assess at least 80% of their patients within 90 days should consider reviewing their patient pathways, and liaise with FLSs of a similar estimated fragility fracture caseload to develop local quality improvement project plans.
- FLSs should compare the number of fracture cases that they submitted with their expected number by June 2017 in time for the next audit report.
- FLSs should check that the date of contact is recorded in their local patient data record. In many cases, this will be the same as the date of assessment.

Investigation

- FLSs that are not able to provide DXA assessment within 90 days of the fragility fracture diagnosis for at least 80% of their patients should review their current patient pathways, and liaise with FLSs of a similar estimated fragility fracture caseload that have delivered this successfully, to develop local quality improvement project plans.
- FLSs that are under-resourced for DXA assessment should work with their local commissioners to develop a business case for improved services.

Intervention

- FLSs with higher than average recorded inappropriate anti-osteoporosis medication decisions should review their clinical pathway, and liaise with other FLSs with similar caseloads to understand whether quality improvement is required.
- FLSs with higher than average missing data should review their pathway for data entry, and liaise with FLSs with similar caseloads to develop a local quality improvement plan.

Falls assessments and interventions

- FLSs not routinely performing or referring for falls risk assessment should review their current clinical pathway and liaise with other FLSs that are able to meet these criteria to develop a local quality improvement plan.
- FLSs with high missing data proportion rates should review their data entry process and develop a quality improvement plan.

Monitoring

- FLSs should review links between secondary, primary and community care to share good practice, and produce local quality improvement plans to develop a more structured approach to monitoring of patients on treatment.

Introduction

Fragility fractures

Fragility fractures are a common and potentially life-changing experience for those who suffer them. One in two women and one in five men in England and Wales break a bone after the age of 50.⁸ There are an estimated 535,900 fragility fractures each year in the UK, including 79,200 hip fractures.¹ This compares with 152,000 strokes per year.¹⁰ Those who suffer a fracture can experience 'loss of mobility and independence, social isolation and depression'.⁸

Any fragility fracture approximately doubles the risk of another fracture, and these fractures are most likely to occur in the next 2 years.^{11,12} This highlights the need for rapid assessment and initiation of anti-osteoporosis medication to those in need. It has been established that 40–50% of patients with a hip fracture have already alerted the NHS that their fracture was imminent by virtue of a previous 'sentinel' fragility fracture.¹³ Of those treated with oral bisphosphonates, short- and medium-term adherence to anti-osteoporosis medication is less than 50% in primary care.¹⁴ Thus, monitoring is a key component necessary to achieve effective secondary fracture prevention.

In the context of an ageing population, the NHS currently faces an essential window of opportunity to improve care for patients at risk of suffering further fragility fractures, and an increasing fracture burden. The current cost of fragility fractures is £4.3 billion per year,¹ excluding any social care costs. Current projections suggest that the number of hip fractures could increase by 65% in the next 20 years if secondary fracture prevention care does not improve.⁸ If improvements are not made, hospitals and social care services risk becoming overwhelmed.

Therapies and interventions approved by NICE significantly reduce the risk of refracture by 20–70% depending on the fracture site.¹⁵ This compares favourably with the 28% reduction seen with antihypertensives for recurrent stroke.¹⁶ Effective secondary fracture prevention throughout the NHS would prevent approximately 54,000 avoidable fragility fractures (including nearly 23,000 hip fractures) over 5 years in the UK.² This is a substantial reduction, leading to benefits for patients, families and carers, as well as a reduction in emergency admissions and acute hospital and social care demand for beds within the NHS.

In 2010, the Royal College of Physicians (RCP) audited the quality of the clinical care delivered to patients who had fallen and fractured a bone, and had been seen in a hospital emergency department (A&E).¹⁷ Only 32% of those with a non-hip fracture received an adequate fracture risk assessment and just 28% were established on anti-osteoporosis medications within 12 weeks. Of these, the percentages were much lower for those not admitted to hospital. The Department of Health (DH) subsequently incentivised primary care to initiate these treatments for such patients but, by the end of the first year of this scheme, fewer than one in five patients were on treatments.¹⁸ These results are consistent with other evidence suggesting that good clinical practice for these patients requires a systematic approach encompassing case finding, assessment, initiation and monitoring of treatment – in other words, an FLS.

Fracture liaison services

Fracture liaison services (FLSs) aim to ensure that identification, investigation, treatment initiation, information and care integration (including monitoring) are consistently and systematically delivered to all patients with fragility fractures.⁸ An FLS usually comprises a dedicated healthcare practitioner who follows evidence-based protocols for secondary fracture prevention with support from a local clinical champion. Although most FLSs are led by, and based in, secondary care, some are delivered by primary care.

FLSs were recommended by the DH in its Prevention Package for Older People in 2009 to improve secondary fracture prevention.¹⁹ Both the 2015 Scottish Intercollegiate Guideline Network national clinical guideline 146 and the 2017 National Osteoporosis Guideline Group, which represents 10 professional societies and organisations in the UK, highlight the need for national coverage of patients by FLSs in their key recommendations.

The unacceptable care gap described in the previous sections is detrimental for patients, their families, NHS providers and commissioners. This report is the first step in understanding current secondary fracture prevention care, improving its efficacy and ultimately preventing those who suffer a fragility fracture from experiencing further fractures.

Fracture Liaison Service Database

The Fracture Liaison Service Database (FLS-DB) comprises two principal audits:

- a facilities audit
- a patient-level audit (presented here).

The facilities audit report was published in May 2016.²⁰ It appraised the national situation regarding the organisation of FLSs. The facilities audit provided a comprehensive national picture of secondary fragility fracture prevention, as well as a comparison of service models.

Eighty-two sites participated in the facilities audit (this is estimated to be just under half of eligible sites); 52 had a dedicated FLS.

The facilities audit identified huge variation in the types of patient identified, and in how they were investigated and monitored for adherence to anti-osteoporosis medication. This was due in part to evidence that current commissioning of the services offered by FLSs is unrelated to the size of FLSs' local population needs and that no clear pathway is available for providers to seek funding for FLSs from commissioners.

In January 2016, the FLS-DB started to collect patient-level data for those diagnosed with a fragility fracture within the NHS between January and June 2016.

Data completeness and case ascertainment

Data completeness

Our initial data-cleaning processes identified potential issues with data completeness. FLSs with at least one of the following were contacted and asked to review and update their data:

- more than 50% missing data overall
- fewer than 100 fracture cases
- more than 10% of fracture cases with the type of fracture classified as 'other'.

FLSs with fewer than 50 cases were excluded from this analysis and were informed of this by the FLS-DB clinical lead; in total, eight FLSs were excluded owing to insufficient case numbers.

The audit had varying levels of completeness for data items, both between FLSs and at a national level, as shown in Tables 1 and 2.

Table 1 Data quality summary table – fields with >20% missing (national level)

Audit question	Missing n	Missing %
1.10 Date of FLS assessment	4,146	22.6
2.01. Current height (metres)	8,741	47.6
2.02 Current weight (kg)	8,734	47.6
2.03 Previous fragility fracture history in adulthood	6,741	36.7
2.04 Family history of hip fracture	6,699	36.5
2.05 Current smoker	6,462	35.2
2.06 At time of index fracture, patient on/taking bone-sparing therapy	6,062	33.0
3.03 Date of DXA* – based on 3.01=ordered	2,313	28.9
3.05 Was the patient's risk of fracture assessed using FRAX or QFracture?	8,134	44.3
4.01 Bone therapy recommended following index fracture	6,089	33.2
4.02 Calcium/vitamin D supplement recommended following index fracture	5,938	32.4
5.01 Was a falls risk assessment performed by FLS?	5,224	28.5
5.10 Referrals – following falls risk assessment	9,605	52.3

N=18,356 for all apart from 3.03, where N=8,009

*Includes both missing data and where patient did not attend DXA appointment

Only one audit question (referrals following falls risk assessment) had more than 50% missing data.

Even though estimated values could be entered, almost half of submitted patients had missing height and weights. The fact that both FRAX and QFracture require these measures and had a lower missing rate suggests that the data are available, but not being entered.

Table 2 Data quality summary table by each submitting FLS

FLS name	Number of cases submitted	Uploaded in bulk (Y/N)	Number of fields (out of 29) with 20% or more missing data	Number of fields (out of 29) with 50% or more missing data
Barnet Hospital Fracture Liaison Service	156	N	3	0
Bromley Healthcare Falls and Fracture Prevention Service	283	Y	2	1
Broomfield Hospital	382	N	9	9
Dorset County Hospital	536	N	20	15
East Lancashire Hospitals NHS Trust	273	N	3	1
East Surrey Hospital	233	N	2	2
FLS West Berkshire	358	Y	3	3
Guy's and St Thomas' NHS Foundation Trust	284	Y	21	21
King's College Hospital – Denmark Hill site	79	N	7	7
Medway NHS Foundation Trust	436	N	12	12
Milton Keynes University Hospital Foundation Trust	134	Y	12	10
Musgrove Park Hospital	811	Y	0	0
North Bristol NHS Trust	1,111	Y	9	2
North Tees and Hartlepool NHS Foundation Trust	553	N	9	5
Nottingham University Hospitals	1,250	Y	11	11
Oxfordshire Fracture Prevention Service	1,210	Y	7	5
Peterborough and Stamford Hospitals NHS Foundation Trust	260	N	2	0
Poole General Hospital	69	Y	15	15
Portsmouth and Southeast Hampshire	936	Y	16	13
Queen Elizabeth Hospital, Woolwich	109	N	7	7
Royal Surrey County Hospital	251	N	1	0
Royal Wolverhampton Hospital NHS Trust	285	N	16	11
Sandwell and West Birmingham Hospitals NHS Trust	86	Y	11	10
St George's Hospital	725	Y	15	7
Sunderland Royal Hospital	584	N	2	0
The Haywood Hospital Burslem Stoke-on-Trent	644	N	0	0
The Hillingdon Hospitals NHS Foundation Trust	110	N	0	0
The Ipswich Hospital NHS Trust	944	N	14	4
The Rotherham NHS Foundation Trust	109	N	8	8
United Lincolnshire Trust	1,218	Y	13	12
University Hospital Lewisham	191	N	11	4
University Hospital Llandough	344	N	10	2
University Hospital of North Durham and Darlington Memorial Hospital	835	N	14	0
University Hospitals Birmingham NHS Foundation Trust	643	Y	4	2
University Hospitals Bristol NHS Foundation Trust	679	N	12	5

FLS name	Number of cases submitted	Uploaded in bulk (Y/N)	Number of fields (out of 29) with 20% or more missing data	Number of fields (out of 29) with 50% or more missing data
West Suffolk Fracture Liaison Service	219	N	3	0
Wye Valley NHS Trust	231	N	4	2
Yeovil Hospital	795	Y	6	0
Total	18,356	–	299	206

The colours represent the number of non-mandatory fields with missing data: green (0–5), amber (6–12) and red (13–25)

FLSs could either upload patient data from legacy local databases or enter patients directly on the RCP webtool. Fourteen FLSs (37%) submitted 80% or more fields with less than 20% missing data. Twenty three FLSs (61%) submitted 80% or more fields with less than 50% missing data.

Fifteen of 38 FLSs (39%) uploaded data from local databases. There was no significant difference in completion rates between FLSs directly entering data vs upload (Fig 1). The number of incomplete fields did not seem associated with caseload volume in the uploaders, while there was a trend for more incomplete records with higher numbers of patients per site in those services with direct entry.

This suggests that further work is required in order to align the data that FLSs routinely collect with the FLS-DB dataset, as well as to improve export of data from FLSs' legacy databases.

Fig 1 Relationships between caseload for an FLS and number of missing fields by method of data entry – uploading vs direct entry

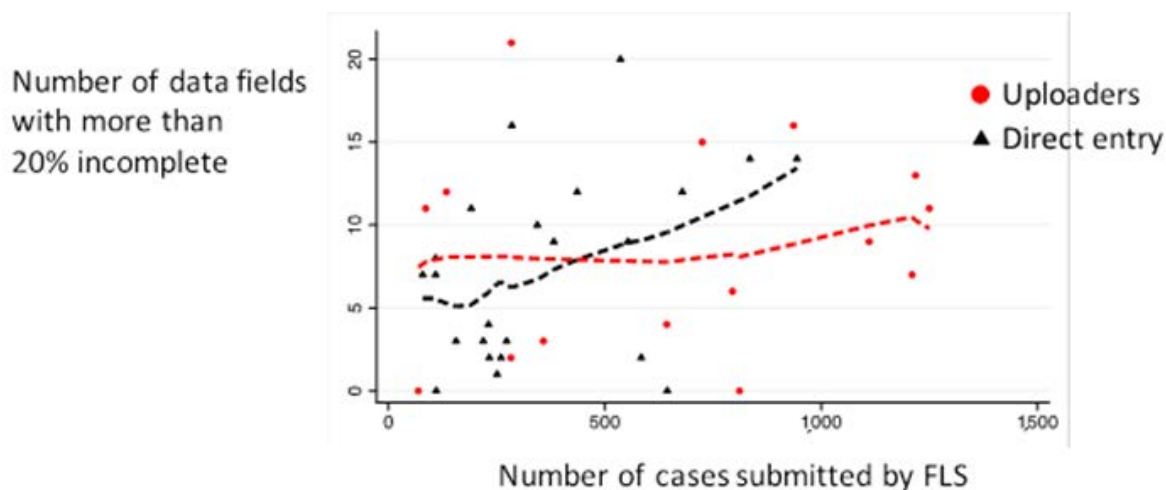


Figure shows each FLS as a data point, with a separate fitted line for uploaders and direct entry

Case ascertainment

A national clinical audit should acquire data on all cases occurring over the audit period, in this case all eligible patients seen by the FLS. However, it is difficult to determine case ascertainment rates (at national and FLS level), as there is no reliable source of external data (such as the Hospital Episode Statistics (HES) or Patient Episode Database for Wales (PEDW)) that can be used to validate how many patients each FLS saw.

To understand what proportion of eligible patients seen by an FLS were entered into the FLS-DB, we asked all FLSs that had submitted patient data to confirm how many patients they identified over 12 months in 2015. We then used this information to calculate an approximate number expected to have been seen between January and June 2016. In five FLSs these data were missing, and nine FLSs were unable to provide this 2015 information. Reasons given included:

- the FLS was not in operation at the time
- the information was not available.

Where data were provided (n=24), case ascertainment ranged from 9% to 268% (interquartile range 29%, median 89%). The varied results indicate that this is an unreliable method of determining case ascertainment.

The number of patients submitted to the FLS-DB compared with the FLSs' estimated caseload is discussed in detail in the Identification section of this report.

Case study 1 – Musgrove Park Hospital – developing a data entry process

Musgrove Park Hospital set up an FLS in November 2015, with the service going live from January 2016. The hospital was keen to appoint a full-time nurse practitioner as well as an IT-literate administrator with experience of data gathering and analysis. November–December 2015 was used to build the office and clinic rooms, as well as to review the requirements of the CCG and FLS-DB and also to visit an established FLS (in this case Yeovil). This enabled the two-person team to get a better feel for the requirements of the service from a clinical viewpoint, as well as requirements for data collection, and also to understand some of the issues experienced by another team.

The decision was taken to use the FLS-DB as the basis for a self-developed Microsoft Excel-based database, which gathered and represented data in the sequence of the national database, so was in essence an Excel table with headers for each of the required fields within the FLS-DB. Additional fields that were not required by the national database were also created, to help with internal process and tracking/recording. This database is housed in a shared drive within the secure hospital network and thus allows shared visibility, although only one person can edit the data at any one time. We also created a dedicated team email account, to allow patients to send in scanned copies of questionnaires, consultants to refer patients to our service and GP surgeries to communicate with us.

At launch on 4 January 2016, we started with a narrow field of focus and looked only at ankle and wrist fractures until we were confident that we were capturing the data correctly and were able to record them satisfactorily. This also caused us to adjust our processes to make them more efficient for ourselves. We also needed a monthly report on all fracture inpatients within our age group of 50 years or over to review against our internal inpatient capture, to identify any patients who we missed on the ward rounds and to then allow follow-up, either personally if still in hospital or via post if they have been discharged.

By early February, we were confident with the system and process, and opened it to all fracture types within our remit. While this process development was going on, we were also inputting data to the national database; we did this via CSV file uploads, as we recognised that an excessive amount of time would be needed to do it manually, record by record, and the risk of manually introducing more typing errors would also be increased. Typing errors still occur, but thankfully the national database would reject records for the key errors, which helped with recognition and problem-solving. The national database itself was new and had many small flaws, as did our local database, but by consistently reporting the errors that we saw and with the FLS-DB helpdesk analysing our data and identifying the cause of the import errors, we both managed to develop and improve our databases.

One key issue that we kept experiencing was duplicate records, but as each reason was identified, we were able to put more checks in place locally or more intelligence into the database nationally, so both sides improved. Our local database uses drop-down boxes in as many fields as possible, so that we get consistent data input in the format required by the national database and thus fewer typing errors. We conduct multiple checks on our own data before uploading and then a duplicate check against the national database, as well as a review of the upload file afterwards; this enables us to confirm successful upload and good data, and quickly identify any erroneous records.

By conducting regular uploads using the import data method, we are able to keep the national database up to date and it only takes about 15 minutes to do each time. Uploads are now routine and done generally once a month. All daily changes are made to the local database and then the whole dataset is uploaded to the national database and will overwrite any incomplete or changed records; this is quicker than trying to track which changes have occurred and thus which individual records need to be updated.

A few key checks to ensure accurate data are:

- comparison of patient names across both databases by exporting the national database and running a VLOOKUP (MS Excel table-to-table comparison) or similar in Excel against the local database
- the duplicate record check on the national database
- a duplicate record check of the local database prior to importing to the national database.

One key thing to note is that, although we were a new start-up and many may think that this put us at a disadvantage, we actually believe that we were fortunate as we had no preconceptions or established processes and thus were able to use the FLS-DB as the start point for our process and system set-up. We were able to set up the local database in the order required by the national database and thus our data were already in the right format and order for uploading. Many of our colleagues had been running their systems for a number of years, and had established processes and data gathering that were different from the FLS-DB requirements, and thus would have had to review and possibly make changes to their routines, which can introduce difficulties.

Ronald Perry
Fracture liaison service administrator

FLS performance summary

As can be seen, there are some FLSs that are meeting key aspects for secondary prevention. With eight summary standards representing performance indicators across the secondary prevention pathway, five FLSs scored green on four or more fields.

Table 3 FLS performance in selected key areas

FLS name	Number of cases submitted	Number of fields (out of 29) with 20% or greater missing data – n	Hip case ascertainment – %	Non-hip case ascertainment – %	Within 90 days (diagnosis to assessment) – %	Within 90 days (diagnosis to DXA) – %	Bone therapy missing – %	Falls assessment done or referred – %	Patients followed up (of those prescribed bone therapy or referred for further clinical opinion/GP) – %
Barnet Hospital Fracture Liaison Service	156	3	*	17.8	93.6	77.1	20.5	91.7	83.3
Bromley Healthcare Falls and Fracture Prevention Service	283	2	6.9	38.7	100	92.4	31.1	100	78.2
Broomfield Hospital	382	9	27.5	30.9	93.7	15.9	5	1.6	0
Dorset County Hospital	536	20	81.3	59.8	90.9	63	36.2	0.9	0
East Lancashire Hospitals NHS Trust	273	3	1.6	26.3	96	72.5	33.3	8.4	62.5
East Surrey Hospital	233	2	1.2	22.6	5.2	6.1	1.7	99.6	0
FLS West Berkshire	358	3	5.1	43.8	96.6	81.2	*	18.2	63.1
Guy's and St Thomas' NHS Foundation Trust	284	21	15.0	62.4	4.9	*	90.5	9.5	0
King's College Hospital – Denmark Hill site	79	7	*	24.3	98.7	*	98.7	*	0

FLS name	Number of cases submitted	Number of fields (out of 29) with 20% or greater missing data – n	Hip case ascertainment – %	Non-hip case ascertainment – %	Within 90 days (diagnosis to assessment) – %	Within 90 days (diagnosis to DXA) – %	Bone therapy missing – %	Falls assessment done or referred – %	Patients followed up (of those prescribed bone therapy or referred for further clinical opinion/GP) – %
Medway NHS Foundation Trust	436	12	59.0	53.2	0	*	70.9	0.9	*
Milton Keynes University Hospital Foundation Trust	134	12	6.0	22.2	95.5	34.1	44	47	60.0
Musgrove Park Hospital	811	0	106.5	74.8	77.2	80.5	3.3	65.8	73.7
North Bristol NHS Trust	1,111	9	94.3	81.5	74.9	57.9	2.3	55.1	49.3
North Tees and Hartlepool NHS Foundation Trust	553	9	52.9	53.4	99.8	53.3	14.5	53.9	0
Nottingham University Hospitals	1,250	11	77.2	63.6	99.4	0	82.2	33	0
Oxfordshire Fracture Prevention Service	1,210	7	54.7	70.7	73.8	53.7	*	24.9	26.9
Peterborough and Stamford Hospitals NHS Foundation Trust	260	2	5.6	28.5	92.3	67.8	*	95.8	0
Poole General Hospital	69	15	*	3.5	0	0	100	40.6	–
Portsmouth and Southeast Hampshire	936	16	11.9	57.0	91.1	72.5	95.8	*	0
Queen Elizabeth Hospital, Woolwich	109	7	7.1	13.8	3.7	0	0	*	*
Royal Surrey County Hospital	251	1	7.9	38.7	92.8	74.3	13.9	93.2	59.6
Royal Wolverhampton Hospital NHS Trust	285	16	7.8	26.9	96.1	*	60.7	1.1	0
Sandwell and West Birmingham Hospitals NHS Trust	86	11	2.6	1.2	51.2	18.5	69.8	90.7	0
St George's Hospital	725	15	127.0	131.3	43.7	68.7	51.6	46.9	15.7

FLS name	Number of cases submitted	Number of fields (out of 29) with 20% or greater missing data – n	Hip case ascertainment – %	Non-hip case ascertainment – %	Within 90 days (diagnosis to assessment) – %	Within 90 days (diagnosis to DXA) – %	Bone therapy missing – %	Falls assessment done or referred – %	Patients followed up (of those prescribed bone therapy or referred for further clinical opinion/Gp) – %
Sunderland Royal Hospital	584	2	63.6	49.2	99.1	56.6	15.1	67	30.2
The Haywood Hospital Burslem Stoke-on-Trent	644	0	15.8	38.8	84	83.6	0	2.6	45.5
The Hillingdon Hospitals NHS Foundation Trust	110	0	5.0	24.8	90.9	70.8	10.9	5.5	50.0
The Ipswich Hospital NHS Trust	944	14	87.2	80.7	35.2	25.9	31.8	52.1	19.3
The Rotherham NHS Foundation Trust	109	8	*	20.6	86.2	86.1	0	16.5	0
United Lincolnshire Trust	1,218	13	56.1	63.0	0	86.8	100	0	–
University Hospital Lewisham	191	11	43.2	52.0	74.3	74.5	27.7	31.9	36.0
University Hospital Llandough	344	10	2.4	32.2	86.6	5.5	18.9	3.5	13.2
University Hospital of North Durham and Darlington Memorial Hospital	835	14	47.4	46.4	76.2	43.1	22.2	2.2	48.1
University Hospitals Birmingham NHS Foundation Trust	643	4	45.4	58.3	72.3	21.3	1.6	57.4	68.1
University Hospitals Bristol NHS Foundation Trust	679	12	100.6	81.1	20	63.9	20.3	*	38.9
West Suffolk Fracture Liaison Service	219	3	29.4	22.4	63.5	74.7	6.4	57.1	76.3
Wye Valley NHS Trust	231	4	2.6	33.9	98.3	0	*	97	*
Yeovil Hospital	795	6	97.5	98.3	46.2	17	12.6	30.8	71.8
Overall (average)	18,356	–	35.6	45.5	66.9	46.5	33.2	32.3	36.4

*Where any 'n' was <3, numbers and percentages were suppressed. Where only one site-level figure has been suppressed, the second-lowest number where n<5 has also been suppressed; where the second-lowest number is not n<5, the second-lowest number has been barnardised (+1/–1) for data protection reasons

Results

38 FLSs participated in this audit and submitted data on 18,356 patients.

Table 4 FLSs submitting data to the FLS-DB patient audit

FLS name	Trust or local health board
1 Barnet Hospital Fracture Liaison Service	Royal Free London NHS Foundation Trust
2 Bromley Healthcare Falls and Fracture Prevention Service	Bromley Healthcare
3 Broomfield Hospital	Mid Essex Hospital Services NHS Trust
4 Dorset County Hospital	Dorset County Hospital NHS Foundation Trust
5 East Lancashire Hospitals NHS Trust	East Lancashire Hospitals NHS Trust
6 East Surrey Hospital	Surrey and Sussex Healthcare NHS Trust
7 FLS West Berkshire	Royal Berkshire NHS Foundation Trust
8 Guy's and St Thomas' NHS Foundation Trust	Guy's and St Thomas' NHS Foundation Trust
9 King's College Hospital – Denmark Hill site	King's College Hospital NHS Foundation Trust
10 Medway NHS Foundation Trust	Medway NHS Foundation Trust
11 Milton Keynes University Hospital Foundation Trust	Milton Keynes University Hospital Foundation Trust
12 Musgrove Park Hospital	Taunton and Somerset NHS Foundation Trust
13 North Bristol NHS Trust	North Bristol NHS Trust
14 North Tees and Hartlepool NHS Foundation Trust	North Tees and Hartlepool NHS Foundation Trust
15 Nottingham University Hospitals	Nottingham University Hospitals NHS Trust
16 Oxfordshire Fracture Prevention Service	Oxford University Hospitals NHS Foundation Trust
17 Peterborough and Stamford Hospitals NHS Foundation Trust	Peterborough and Stamford Hospitals NHS Foundation Trust
18 Poole General Hospital	Poole Hospital NHS Foundation Trust
19 Portsmouth and Southeast Hampshire	Portsmouth Hospitals NHS Trust
20 Queen Elizabeth Hospital, Woolwich	Lewisham and Greenwich NHS Trust
21 Royal Surrey County Hospital	Royal Surrey County Hospital NHS Foundation Trust
22 Royal Wolverhampton Hospital NHS Trust	Royal Wolverhampton NHS Trust
23 Sandwell and West Birmingham Hospitals NHS Trust	Sandwell and West Birmingham Hospitals NHS Trust
24 St George's Hospital	St George's University Hospitals NHS Foundation Trust
25 Sunderland Royal Hospital	City Hospitals Sunderland NHS Foundation Trust
26 The Haywood Hospital Burslem Stoke-on-Trent	Staffordshire and Stoke-on-Trent Partnership NHS Trust
27 The Hillingdon Hospitals NHS Foundation Trust	The Hillingdon Hospitals NHS Foundation Trust
28 The Ipswich Hospital NHS Trust	The Ipswich Hospital NHS Trust
29 The Rotherham NHS Foundation Trust	The Rotherham NHS Foundation Trust
30 United Lincolnshire Trust	United Lincolnshire Hospitals NHS Trust
31 University Hospital Lewisham	Lewisham and Greenwich NHS Trust
32 University Hospital Llandough	Cardiff and Vale University Health Board
33 University Hospital of North Durham and Darlington Memorial Hospital	County Durham and Darlington NHS Foundation Trust
34 University Hospitals Birmingham NHS Foundation Trust	University Hospitals Birmingham NHS Foundation Trust
35 University Hospitals Bristol NHS Foundation Trust	University Hospitals Bristol NHS Foundation Trust
36 West Suffolk Fracture Liaison Service	West Suffolk NHS Foundation Trust
37 Wye Valley NHS Trust	Wye Valley NHS Trust
38 Yeovil Hospital	Yeovil District Hospital NHS Foundation Trust

A list of non-participating trusts can be found in Appendix E.

Summary of performance against guidance/best practice

	Standard	Discussion
Quality	NOS clinical standards for FLSs: The FLS will participate in any national audits undertaken. ⁸	38 FLSs participated in the audit, submitting data on 18,356 eligible patients.
		There was wide variability in the number of cases submitted successfully by the FLSs.
Identification	NOS clinical standards for FLSs: All patients aged 50 years and over with a new fragility fracture or a newly reported vertebral fracture will be systematically and proactively identified. ⁸	Not all FLSs submitted their expected fragility fracture caseload to the audit. A low rate of vertebral fractures was identified.
Investigation	NICE CG146: Consider assessment of fracture risk in all women aged 65 years and over and all men aged 75 years and over, and in women aged under 65 years and men aged under 75 years in the presence of risk factors, for example: previous fragility fracture. ³	35% of all patients and 42% of patients aged below 75 were assessed using FRAX or QFracture.
	NOS clinical standards for FLSs: Patients will have a bone health assessment within 3 months of an incident fracture. ⁸	72% of patients aged 50–74 had a DXA ordered or recommended, or had previously had a DXA in the past 2 years.
		47% of patients referred for a DXA had this performed within 90 days of their fracture diagnosis.
Intervention	NICE TA161 and NOS clinical standards for FLSs: Patients at increased risk of further fracture will be offered appropriate bone-protection treatments. ^{4,8}	Anti-osteoporosis medication was considered inappropriate for 4,704 (26%) patients.
		14% were referred for another clinical opinion or to their GP.
		Of those recommended anti-osteoporosis medication, 2,729 (78%) were prescribed alendronate (range 0–100%), 183 (5%) were prescribed risedronate (range 0–26%), 216 (6%) were prescribed zoledronate (range 0–64%) and all other therapies are <0.5% per drug.
	NICE TA204: Denosumab is recommended as a treatment option for the secondary prevention of osteoporotic fragility fractures only in postmenopausal women at increased risk of fractures who are unable to comply with the special instructions for administering alendronate and either risedronate or etidronate, or have an intolerance of, or a contraindication to, those treatments. ⁵	350 (10%) patients were prescribed denosumab (range 0–40%).

	Standard	Discussion
Falls assessments and interventions	NICE CG161, NICE QS86, NOS clinical standards for FLSs, BOA <i>The care of patients with fragility fracture</i> : Older people who present for medical attention because of a fall or report recurrent falls in the past year should be offered a multifactorial falls risk assessment. ^{6-8,21}	32% of patients received or were referred for a falls risk assessment.
	NICE CG161, NICE QS86: Older people reporting a fall should be considered for strength and balance training. ^{6,7}	1% of patients were directly referred to a strength and balance exercise programme.
Monitoring	NOS clinical standards for FLSs: Patients who are recommended drug therapy to reduce risk of fracture will be reviewed within 4 months of fracture to ensure that appropriate treatment has been started. ⁸	Of the patients recommended anti-osteoporosis medication by their FLS 771 (22%) were on treatment within the first 4 months.

Anti-osteoporosis medication included in this audit: alendronate, risedronate, ibandronate, raloxifene, teriparatide, strontium, denosumab, zoledronate, systemic oestrogens, systemic oestrogen and progesterone, calcitriol and alfacalcidol

Identification

What proportion of patients presenting with a fragility fracture are identified by an FLS?

Standard:

All patients aged 50 years and over with a new fragility fracture or a newly reported vertebral fracture will be systematically and proactively identified (NOS clinical standards for FLSs).

Commentary:

Systematic case finding of patients presenting with fragility fractures is the essential first step for an effective FLS. A low rate of case ascertainment reflects suboptimal case finding and/or failure to submit all identified cases.

Table 5 compares the patient numbers submitted by each FLS with the estimated fragility fracture caseload, derived using the methods developed in the feasibility study of the FLS-DB.²³ This method produces an estimated total number of fragility fractures that an FLS should expect to see, and was determined by multiplying the number of hip fractures derived from NHFD returns by five. The limitations of this simple rule are clearly apparent. The actual ratio of all fragility fractures to hip fractures is likely to vary between catchment populations owing to variation in age structure. As part of the facilities audit, all FLSs confirmed the hospitals from which they saw patients. The estimated fragility fracture caseload for the first 6 months was derived by multiplying the actual number of hip fractures recorded by the National Hip Fracture Database (NHFD) between January and June 2016 by five. Five FLSs covered more than one NHFD site; in this instance, the hip fracture numbers were combined.

There was wide variability in the number of cases submitted successfully by the FLSs. This is likely to be due to true differences in numbers of patients identified by the FLS, as well as data entry issues.

Not all FLSs submitted their expected fragility fracture caseload to the audit. Five (13%) FLSs submitted over 80% of their estimated fragility fracture caseload for both hip and non-hip fractures. In total, 16 FLSs (42%) submitted over 50% of their estimated fragility fracture caseload for non-hip fractures.

Fig 2 shows that there was a wide variation in the number of patients with hip fracture submitted, and a low rate of vertebral fractures was identified. Patients with a hip fracture are at a very high risk of refracture, and clinical trials have demonstrated that anti-osteoporosis medication in this patient group significantly reduces refracture rates. Given the low treatment initiation and adherence in this patient group, their inclusion within a clinical audit is important. The NHFD focuses on inpatient quality metrics and the inclusion criteria require that patients should be entered into both audits.

Seventeen FLSs submitted fewer than 10% of their expected hip fracture patients, suggesting that some FLSs are either not identifying these patients or are not entering them into the FLS-DB. In the 2016 facilities audit, of the 52 participating sites with a confirmed FLS, 11 reported that they were not commissioned to see hip fracture patients.²⁰

Recommendations:

- FLSs should review their pathways so that there is a local process to identify all patients aged 50 years and over with a new fragility fracture, including hip fracture patients and those with newly reported vertebral fractures.

- FLSs should review or process-map their pathway for patient identification, and liaise with FLSs of a similar estimated fragility fracture caseload to develop local quality improvement project plans within a realistic timescale.
- FLSs should compare the number of fracture cases that they submitted with their expected number by June 2017 in time for the next audit report.

Table 5 Percentage of estimated hip and non-hip fragility fracture patients submitted

FLS name	From NHFD		From FLS-DB		FLS-DB case identification %	
	Hip	Non-hip [†]	Hip	Non-hip [†]	Hip	Non-hip [†]
Barnet Hospital Fracture Liaison Service	212	848	3	151	1.4	17.8
Bromley Healthcare Falls and Fracture Prevention Service	175	700	12	271	6.9	38.7
Broomfield Hospital	229	916	63	283	27.5	30.9
Dorset County Hospital	166	664	135	397	81.3	59.8
East Lancashire Hospitals NHS Trust	248	992	4	261	1.6	26.3
East Surrey Hospital	252	1,008	3	228	1.2	22.6
FLS West Berkshire	198	792	10	347	5.1	43.8
Guy's and St Thomas' NHS Foundation Trust	107	428	16	267	15.0	62.4
King's College Hospital – Denmark Hill site	73	292	*	70	*	24.3
Medway NHS Foundation Trust	156	624	92	332	59.0	53.2
Milton Keynes University Hospital Foundation Trust	134	536	8	119	6.0	22.2
Musgrove Park Hospital	200	800	213	598	106.5	74.8
North Bristol NHS Trust	264	1,056	249	861	94.3	81.5
North Tees and Hartlepool NHS Foundation Trust	206	824	109	440	52.9	53.4
Nottingham University Hospitals	377	1,508	291	959	77.2	63.6
Oxfordshire Fracture Prevention Service	358	1,432	196	1,013	54.7	70.7
Peterborough and Stamford Hospitals NHS Foundation Trust	216	864	12	246	5.6	28.5
Poole General Hospital	472	1,888	*	68	*	3.5
Portsmouth and Southeast Hampshire	386	1,544	46	880	11.9	57.0
Queen Elizabeth Hospital, Woolwich	170	680	12	94	7.1	13.8
Royal Surrey County Hospital	152	608	12	235	7.9	38.7
Royal Wolverhampton Hospital NHS Trust	245	980	19	264	7.8	26.9
Sandwell and West Birmingham Hospitals NHS Trust	191	764	5	9	2.6	1.2
St George's Hospital	111	444	141	583	127.0	131.3
Sunderland Royal Hospital	214	856	136	421	63.6	49.2
The Haywood Hospital Burslem Stoke-on-Trent	374	1,496	59	580	15.8	38.8
The Hillingdon Hospitals NHS Foundation Trust	101	404	5	100	5.0	24.8
The Ipswich Hospital NHS Trust	227	908	198	733	87.2	80.7
The Rotherham NHS Foundation Trust	130	520	*	108	*	20.6
United Lincolnshire Trust	394	1,576	221	993	56.1	63.0
University Hospital Lewisham	74	296	32	154	43.2	52.0
University Hospital Llandough	255	1,020	6	328	2.4	32.2

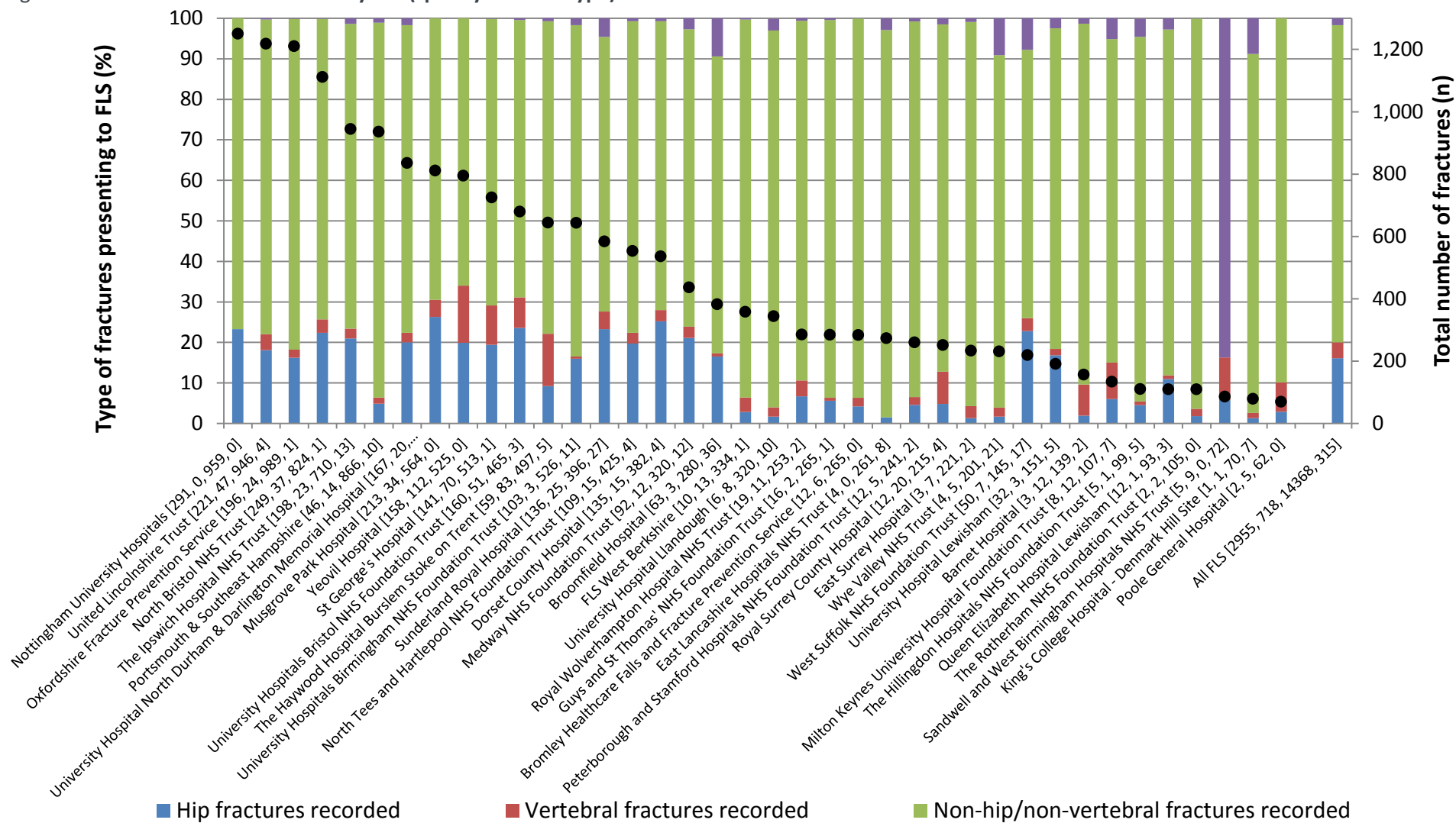
Fracture Liaison Service Database (FLS-DB) clinical audit. April 2017

FLS name	From NHFD		From FLS-DB		FLS-DB case identification %	
	Hip	Non-hip [†]	Hip	Non-hip [†]	Hip	Non-hip [†]
University Hospital of North Durham and Darlington Memorial Hospital	352	1,408	167	654	47.4	46.4
University Hospitals Birmingham NHS Foundation Trust	227	908	103	529	45.4	58.3
University Hospitals Bristol NHS Foundation Trust	159	636	160	516	100.6	81.1
West Suffolk Fracture Liaison Service	170	680	50	152	29.4	22.4
Wye Valley NHS Trust	152	608	4	206	2.6	33.9
Yeovil Hospital	162	648	158	637	97.5	98.3
Overall (average)	82,89	33,156	2,947	15,087	35.6	45.5

*Where any 'n' was <3, numbers and percentages were suppressed. Where only one site-level figure has been suppressed, the second-lowest figure where n<5 has also been suppressed for data protection reasons. Where the second-lowest number is not n<5, the second-lowest number has been barnardised (+1/-1)

[†]Numbers of non-hip fractures, calculated from 2016 NHFD data using 'rule of 5', were used to estimate the annual fragility fracture caseload in order to estimate the percentage case finding by FLSs for the 6 months of the year for hip and non-hip fractures. The NHFD data may underestimate the number of hip fractures, as the NHFD only includes those aged 60 years and over while the FLS-DB includes those aged 50 and over. However, very few patients sustain a fragility fracture of the hip between 50 and 60 years and so underestimation is likely to be small

Fig 2 Anatomical site of first fracture by FLS (split by fracture type)



How quickly are patients identified and seen?

Standard:

Patients will have a bone health assessment, and their need for a comprehensive falls risk assessment will be evaluated within 3 months of the incident fracture (NOS clinical standards for FLSs).⁸

Commentary:

Based on the data submitted, nearly half of all submitted patients were assessed (by the FLS) within 30 days of their fracture diagnosis; 10% were assessed after 91 or more days.

Twenty FLSs assessed at least 80% of their patients within 90 days and eight FLSs assessed over 80% within 30 days (Table 6). Ten FLSs were unable to demonstrate that they were able to see at least 50% of their patients within 90 days. Regarding the date assessment, six FLSs were unable to successfully submit this for over 50% of their patients.

There was no association between the size (in terms of caseload) of FLS and the proportion of patients with fracture seen within 90 days (Fig 3), suggesting that both small and large services are able to perform well against this standard if appropriate systems are implemented.

Recommendations:

- FLSs that are not able to assess at least 80% of their patients within 90 days should consider reviewing their patient pathways, and liaise with FLSs of a similar estimated fragility fracture caseload to develop local quality improvement project plans.
- FLSs should check that the date of contact is recorded in their local patient data record. In many cases, this will be the same as the date of assessment.

Fig 3 Relationship between total number of patients submitted by an FLS and the proportion assessed within 90 days

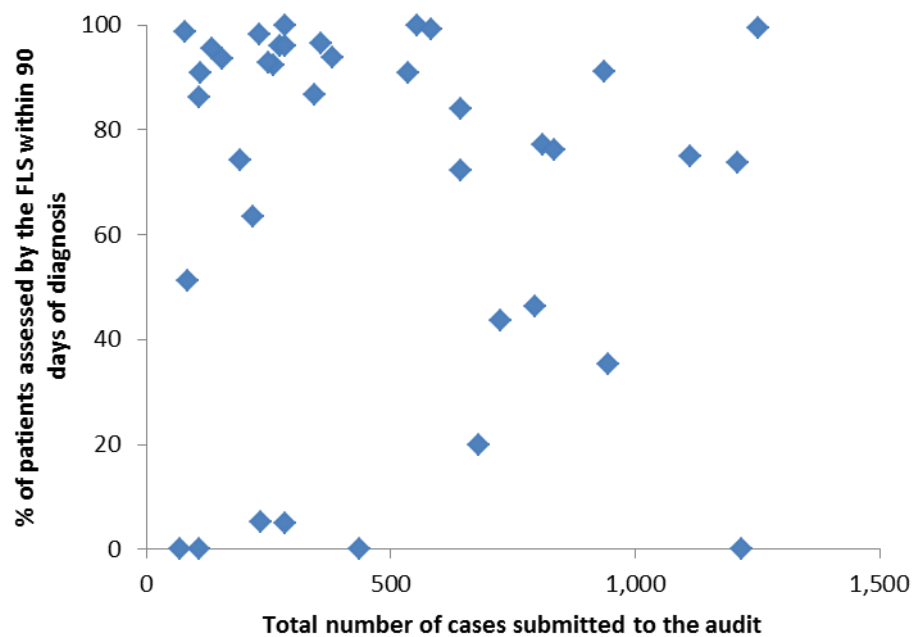


Table 6 Time from diagnosis of fracture to FLS assessment

FLS name	Number of cases submitted	Diagnosis to FLS assessment (days)									
		Within 7 days		Within 30 days		Within 90 days		91 days or more		Missing [†]	
		N	n	%	n	%	n	%	n	%	%
Barnet Hospital Fracture Liaison Service	156	32	20.5	93	59.6	146	93.6	7	4.5	3	1.9
Bromley Healthcare Falls and Fracture Prevention Service	283	44	15.5	222	78.4	283	100	0	0	0	0
Broomfield Hospital	382	306	80.1	348	91.1	358	93.7	10	2.6	14	3.7
Dorset County Hospital	536	48	9	271	50.6	487	90.9	22	4.1	27	5
East Lancashire Hospitals NHS Trust	273	74	27.1	212	77.7	262	96	11	4	0	0
East Surrey Hospital	233	0	0	*	*	12	5.2	219	94	*	*
FLS West Berkshire	358	113	31.6	278	77.7	346	96.6	12	3.1	*	*
Guy's and St Thomas' NHS Foundation Trust	284	0	0	0	0	14	4.9	13	4.6	257	90.5
King's College Hospital – Denmark Hill site	79	65	81	74	93.7	78	98.7	*	*	0	0
Medway NHS Foundation Trust	436	0	0	0	0	0	0	104	23.9	332	76.1
Milton Keynes University Hospital Foundation Trust	134	39	29.1	91	67.9	128	95.5	6	4.5	0	0
Musgrove Park Hospital	811	281	34.6	387	47.7	626	77.2	57	7	128	15.8
North Bristol NHS Trust	1,111	317	28.5	602	54.2	832	74.9	37	3.3	242	21.8
North Tees and Hartlepool NHS Foundation Trust	553	225	40.5	542	98	552	99.8	0	0	*	*
Nottingham University Hospitals	1,250	1,195	95.6	1,234	98.7	1,242	99.4	7	0.5	*	*
Oxfordshire Fracture Prevention Service	1,210	282	23.3	589	48.7	893	73.8	307	25.4	10	0.8
Peterborough and Stamford Hospitals NHS Foundation Trust	260	32	12.3	148	56.9	240	92.3	20	7.3	*	*
Poole General Hospital	69	0	0	0	0	0	0	0	0	69	100
Portsmouth and Southeast Hampshire	936	815	87.1	830	88.7	853	91.1	4	0.4	79	8.4
Queen Elizabeth Hospital, Woolwich	109	0	0	*	*	*	*	99	90.8	6	5.5
Royal Surrey County Hospital	251	60	23.9	176	70.1	233	92.8	9	3.6	9	3.6

FLS name	Number of cases submitted	Diagnosis to FLS assessment (days)									
		Within 7 days		Within 30 days		Within 90 days		91 days or more		Missing [†]	
		N	n	%	n	%	n	%	n	%	%
Royal Wolverhampton Hospital NHS Trust	285	169	59.3	268	94	274	96.1	3	1.1	8	2.8
Sandwell and West Birmingham Hospitals NHS Trust	86	0	0	*	*	44	51.2	41	47.7	*	*
St George's Hospital	725	86	11.9	116	16	317	43.7	140	19.3	268	37
Sunderland Royal Hospital	584	468	80.1	535	91.6	579	99.1	5	0.9	0	0
The Haywood Hospital Burslem Stoke-on-Trent	644	*	*	46	7.1	541	84	102	15.8	*	*
The Hillingdon Hospitals NHS Foundation Trust	110	30	27.3	82	74.5	100	90.9	10	8.2	*	*
The Ipswich Hospital NHS Trust	944	211	22.4	255	27	332	35.2	136	14.4	476	50.4
The Rotherham NHS Foundation Trust	109	0	0	*	*	94	86.2	16	13.8	0	0
United Lincolnshire Trust	1,218	0	0	0	0	0	0	0	0	1,218	100
University Hospital Lewisham	191	15	7.9	106	55.5	142	74.3	25	13.1	24	12.6
University Hospital Llandough	344	7	2	157	45.6	298	86.6	3	0.9	43	12.5
University Hospital of North Durham and Darlington Memorial Hospital	835	17	2	132	15.8	636	76.2	155	18.6	44	5.3
University Hospitals Birmingham NHS Foundation Trust	643	277	43.1	399	62.1	465	72.3	6	0.9	172	26.7
University Hospitals Bristol NHS Foundation Trust	679	122	18	134	19.7	136	20	0	0	543	80
West Suffolk Fracture Liaison Service	219	0	0	3	1.4	139	63.5	72	32.9	8	3.7
Wye Valley NHS Trust	231	163	70.6	225	97.4	227	98.3	*	*	*	*
Yeovil Hospital	795	12	1.5	39	4.9	367	46.2	256	32.2	172	21.6
Overall (average)	18,356	5,504	30	8,598	46.8	12,280	66.9	1,912	10.4	4,164	22.7

*Where any n<3, numbers and percentages were suppressed. Where only one site-level figure has been suppressed, the second-lowest number where n<5 has also been suppressed; where the second-lowest number is not n<5, the second-lowest number (any size) has been barnardised (+1/−1) for data protection reasons

[†]Records were set to missing where date of FLS assessment and/or date of fracture diagnosis was not entered or uploaded, or where the date of FLS assessment is stated as being before date of fracture diagnosis

Case study 2 – Sunderland Hospital – identifying patients

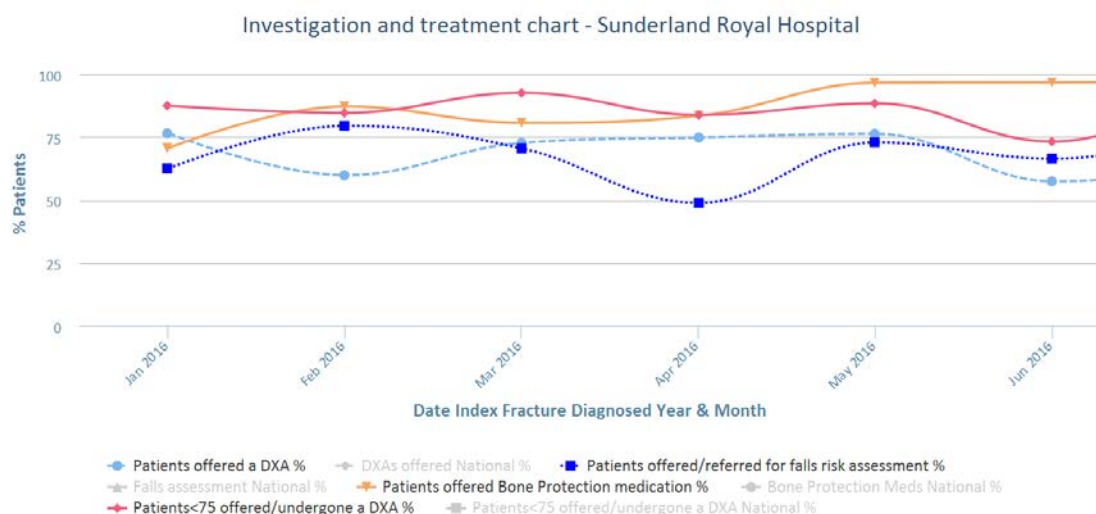
The FLS at Sunderland Hospital sees over 1,700 patients per year (based on 2015 facilities audit data). It is a 7-day FLS. Sunderland Hospital's FLS has developed a comprehensive identification pathway where most patients are captured on the day of presentation to orthopaedics. 80% of patients are assessed within 7 days of their fracture diagnosis.

The FLS is based in the fracture clinic and is in the directorate of trauma and orthopaedics. The team comprises a trauma coordinator and two band 7 nurses. Sunderland FLS endeavours to identify and assess patients suitable for the FLS on the day that they present to orthopaedics.

When coming on duty at 7.30am, the fracture liaison nurse generates a trauma clinic list and identifies patients aged 50+ who are booked into the trauma clinic. The nurse attends the trauma meeting at 8.15am and identifies all the inpatients who have presented with a suspected fragility fracture to the orthopaedic ward or outlying medical wards. The trauma clinic does not start until 10.30am; therefore, the nurse visits the identified inpatients and carries out a bone health assessment, including FRAX, and then decides on DXA referral or treatment recommendation. The nurse returns to clinic and identifies all patients who need bone health assessments. Once they have been seen by an orthopaedic consultant, the nurse carries out the assessment. This clinic usually ends at 12.30pm and the afternoon clinic starts at 2.00pm. For the afternoon clinic, the identification process is repeated. At the weekend, there are no afternoon clinics; therefore, this process only occurs once, from 10.30am to 12.30pm.

To ensure that no patients are missed by the FLS during the above process, further investigation is carried out by reviewing consultant dictation each day. As consultant dictation is downloaded on the day that the patient is seen, the nurse is able to review the dictations, and identify patients who would benefit from a telephone assessment. In between the morning and afternoon clinics, the nurse reviews the dictations, identifies any remaining patients on the ward and carries out the associated administration. This includes ordering DXA scans, dictating letters to GPs and entering data onto FLS-DB, although this is not an exhaustive list.

Julie Walmsley, trauma coordinator, FLS team at Sunderland Hospital



Investigation

What proportions of patients are assessed with a DXA scan?

Standards:

- *Consider assessment of fracture risk in all women aged 65 years and over and all men aged 75 years and over, and in women aged under 65 years and men aged under 75 years in the presence of risk factors, for example: previous fragility fracture (NICE CG146).³*
- *Patients will have a bone health assessment within 3 months of an incident fracture (NOS clinical standards for FLSs).⁸*

Commentary:

Six FLSs were able to scan individuals with a DXA within 90 days in over 80% of cases. Sixteen FLSs were unable to submit a DXA outcome for more than 50% of cases within 90 days. Given the importance of DXA for assessing fracture risk, timely assessment is usually needed to allow time-appropriate recommendations for the initiation of anti-osteoporosis medication.

The number of patients aged 75 years and older who had a DXA ordered and/or recommended varied widely across the 38 FLSs. This is likely to reflect differences in the interpretation of NICE TA161, which states: 'If a woman aged 75 years or older has not previously had her BMD measured, a DXA scan may not be required if the responsible clinician considers it to be clinically inappropriate or unfeasible.'⁴ It would appear that some FLSs interpret this as an 'opt in' for DXA, while for others it is an 'opt out'. Results may also depend on rules relating to local CCG commissioning.

Recommendations:

- FLSs that are not able to provide DXA assessment within 90 days of the fragility fracture diagnosis for at least 80% of their patients should review their current patient pathways, and liaise with FLSs of a similar estimated fragility fracture caseload that have delivered this successfully, to develop local quality improvement project plans.
- FLSs that are under-resourced for DXA assessment should work with their local commissioners to develop a business case for improved services.

Table 7 Proportion of patients assessed with a DXA scan by anatomical site of index fracture

Site of index fracture	DXA										
	Ordered		Recommended		Done in past 24 months		Not ordered		Missing		Total
	n	%	n	%	n	%	n	%	n	%	n
Hip	678	22.9	200	6.8	80	2.7	1,662	56.2	335	11.3	2,955
Vertebral	325	45.3	51	7.1	34	4.7	236	32.9	72	10	718
Non-hip/non-vertebral	6,886	47.9	1,043	7.3	502	3.5	4,103	28.6	1,834	12.8	14,368
Missing	120	38.1	14	4.4	11	3.5	96	30.5	74	23.5	315
Overall (average)	8,009	43.6	1,308	7.1	627	3.4	6,097	33.2	2,315	12.6	18,356

Fig 4 Proportion of patients assessed with a DXA scan by age group

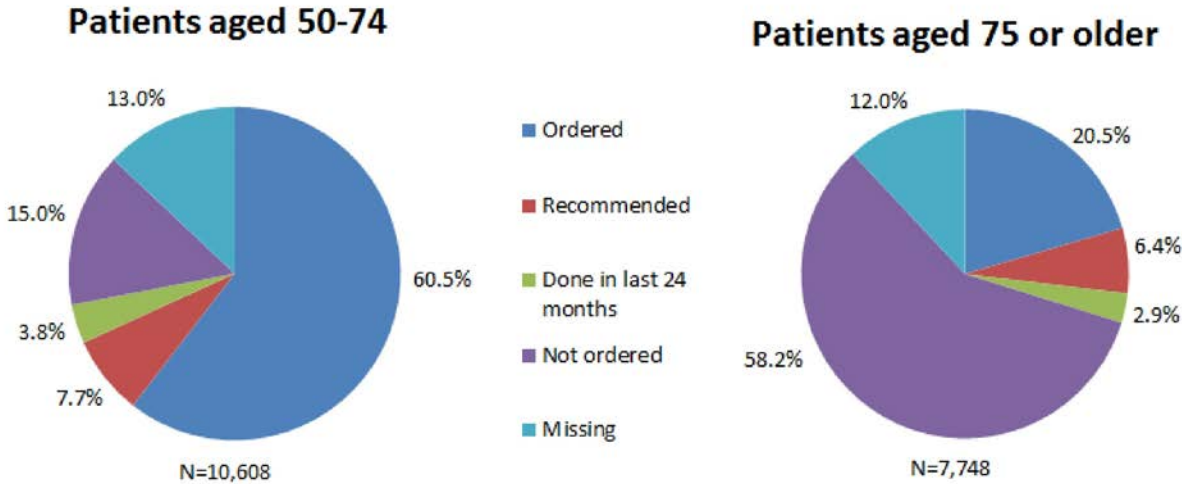


Table 8 Time to DXA from fracture diagnosis (days) in those recommended a DXA scan

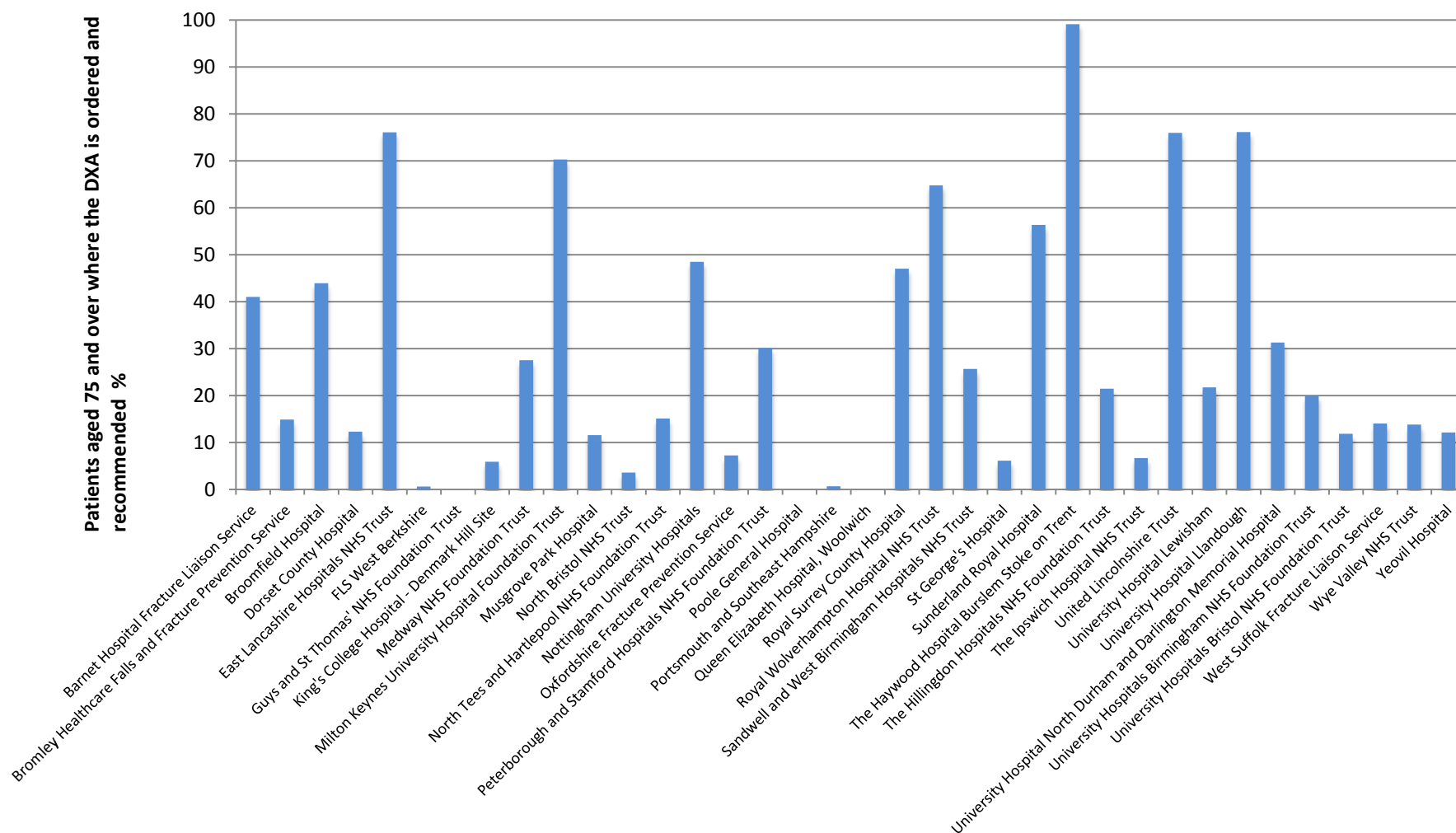
FLS name	Number of cases submitted	Time to DXA scan from fracture diagnosis (days) [†]										
		Within 7 days		Within 30 days		Within 90 days		91 days or more		Missing [†]		Total DXA recommended
		n	%	n	%	n	%	n	%	n	%	N
Barnet Hospital Fracture Liaison Service	156	*	*	13	13.5	74	77.1	14	14.6	9	8.3	96
Bromley Healthcare Falls and Fracture Prevention Service	283	0	0	18	17.1	97	92.4	7	5.7	*	*	105
Broomfield Hospital	382	*	*	*	*	54	15.9	271	79.7	15	4.4	340
Dorset County Hospital	536	0	0	*	*	116	63	56	30.4	13	6.5	184
East Lancashire Hospitals NHS Trust	273	*	*	56	25.2	161	72.5	24	10.4	38	17.1	222
East Surrey Hospital	233	*	*	*	*	14	6.1	214	93.4	*	*	229
FLS West Berkshire	358	0	0	51	27.4	151	81.2	18	9.7	17	9.1	186
Guy's and St Thomas' NHS Foundation Trust	284	0	0	0	0	*	*	*	*	25	86.2	29
King's College Hospital – Denmark Hill site	79	0	0	0	0	*	*	0	0	*	*	2
Medway NHS Foundation Trust	436	0	0	0	0	*	*	135	98.5	*	*	137
Milton Keynes University Hospital Foundation Trust	134	0	0	4	4.4	31	34.1	5	5.5	55	60.4	91
Musgrove Park Hospital	811	*	*	26	9.8	214	80.5	36	13.5	17	6	266
North Bristol NHS Trust	1,111	0	0	*	*	238	57.9	85	20.4	89	21.7	411
North Tees and Hartlepool NHS Foundation Trust	553	0	0	4	1.3	163	53.3	17	5.9	125	40.8	306
Nottingham University Hospitals	1,250	0	0	0	0	0	0	0	0	839	100	839
Oxfordshire Fracture Prevention Service	1,210	*	*	22	4.3	290	53.7	91	16.9	159	29.4	540
Peterborough and Stamford Hospitals NHS Foundation Trust	260	0	0	8	4.5	120	67.8	53	29.9	4	2.3	177
Poole General Hospital	69	0	0	0	0	0	0	0	0	0	0	0
Portsmouth and Southeast Hampshire	936	0	0	0	0	29	72.5	4	10	7	17.5	40

FLS name	Number of cases submitted	Time to DXA scan from fracture diagnosis (days) [†]										
		Within 7 days		Within 30 days		Within 90 days		91 days or more		Missing [†]		Total DXA recommended
		n	%	n	%	n	%	n	%	n	%	N
Queen Elizabeth Hospital, Woolwich	109	0	0	0	0	0	0	0	0	0	0	0
Royal Surrey County Hospital	251	0	0	15	9.9	113	74.3	28	18.4	11	7.2	152
Royal Wolverhampton Hospital NHS Trust	285	*	*	*	*	*	*	0	0	4	80	5
Sandwell and West Birmingham Hospitals NHS Trust	86	0	0	0	0	5	18.5	5	18.5	17	63	27
St George's Hospital	725	15	4.5	31	9.3	230	68.7	33	9.9	72	21.5	335
Sunderland Royal Hospital	584	*	*	78	20.6	214	56.6	27	6.9	138	36.5	378
The Haywood Hospital Burslem Stoke-on-Trent	644	9	1.2	52	8.1	537	83.6	103	16	*	*	642
The Hillingdon Hospitals NHS Foundation Trust	110	0	0	8	16.7	34	70.8	5	10.4	9	18.8	48
The Ipswich Hospital NHS Trust	944	9	2	10	2.2	119	25.9	221	48.1	119	25.9	459
The Rotherham NHS Foundation Trust	109	0	0	*	*	93	86.1	14	13.9	0	0	108
United Lincolnshire Trust	1,218	*	*	32	20.1	138	86.8	19	11.9	*	*	159
University Hospital Lewisham	191	0	0	9	9.6	70	74.5	18	19.1	6	6.4	94
University Hospital Llandough	344	0	0	*	*	15	5.5	184	72.7	55	21.7	253
University Hospital of North Durham and Darlington Memorial Hospital	835	0	0	3	0.8	169	43.1	94	24	129	32.9	392
University Hospitals Birmingham NHS Foundation Trust	643	12	4.9	16	6.6	52	21.3	4	1.6	188	77	244
University Hospitals Bristol NHS Foundation Trust	679	7	6.5	41	38	69	63.9	9	8.3	30	27.8	108
West Suffolk Fracture Liaison Service	219	0	0	7	7.7	68	74.7	15	16.5	8	8.8	91
Wye Valley NHS Trust	231	0	0	0	0	0	0	0	0	67	100	67
Yeovil Hospital	795	0	0	3	1.2	42	17	163	66	42	17	247
Overall (average)	18,356	66	0.8	518	6.5	3,725	46.5	1,971	24.6	2,313	28.9	8,009

*Where any n<3, numbers and percentages were suppressed. Where only one site-level figure has been suppressed, the second-lowest number where n<5 has also been suppressed; where the second-lowest number is not n<5; the second-lowest number (any size) has been barnardised (+1/-1) for data protection reasons

[†]Includes only records where Q3.01 DXA=ordered

Fig 5 Proportion of patients aged 75 and over where a DXA was ordered and/or recommended



Hospitals with fewer than 10 patients aged over 75 have been excluded from this figure

Intervention

Was anti-osteoporosis medication recommended after index fracture?

Standards:

Patients at increased risk of further fracture will be offered appropriate bone-protection treatments (NICE TA161 and NOS clinical standards for FLSs).^{4,8}

Commentary:

Of the patients with a recorded treatment outcome, 29% were recommended bone therapy and 21% required further clinical input.

There was marked variability in the proportion of patients aged 50–74 who were recommended as being inappropriate for therapy (Fig 6). Further work ensuring that all patients have the same chance of being offered anti-osteoporosis therapy, irrespective of their locality, is needed.

The 2010 RCP National Audit of Falls and Bone Health reported that 43% of patients received appropriate treatment for bone health (including inappropriate).¹⁷ Of the 18,356 patients included in this report, 60% had a treatment recommendation or decision documented.

The highest treatment rate of any FLS was 51%. If all fracture patients in England received a comparable service, we estimate that 21,848 fractures would be prevented over 5 years (up to 2020), including 9,157 hip fractures. The prevention of hip fractures alone would be expected to lead to a saving of over £151 million over the same period.*

The recommendation for bone therapy is a clinical decision based on clinical expertise, the evidence base and current national guidelines. Surprisingly, the proportion of patients determined to be 'inappropriate' for treatment varied considerably between FLSs, with eight FLSs considering that more than 50% of their patients were inappropriate for treatment. Eight sites were able to deliver treatment (with oral bisphosphonates, denosumab or zoledronate) to more than 30% of their fracture patients. For all FLSs, a total of 3,488 patients were treated (with oral bisphosphonates, denosumab or zoledronate), which is 19% of all fracture patients.

Despite NICE recommendations, there was considerable variation in the types of bone therapy recommended by FLSs. Alendronate was the most commonly recommended agent overall with 78%, although proportions varied between FLSs from 0 to 100%. The recommendation of parenteral bone therapy, denosumab (10%) and/or zoledronate (6%) also showed marked variability, from 0% to 40% and 0% to 64% respectively.

* All benefits are gross and do not take account of costs of FLS provision. All benefits are calculated compared with usual care.

Recommendations:

- FLSs with higher than average recorded inappropriate therapy decisions should review their clinical pathway, and liaise with other FLSs with similar caseloads to understand whether quality improvement is required.
- FLSs with higher than average missing data should review their pathway for data entry, and liaise with FLSs with similar caseloads to develop a local quality improvement plan.

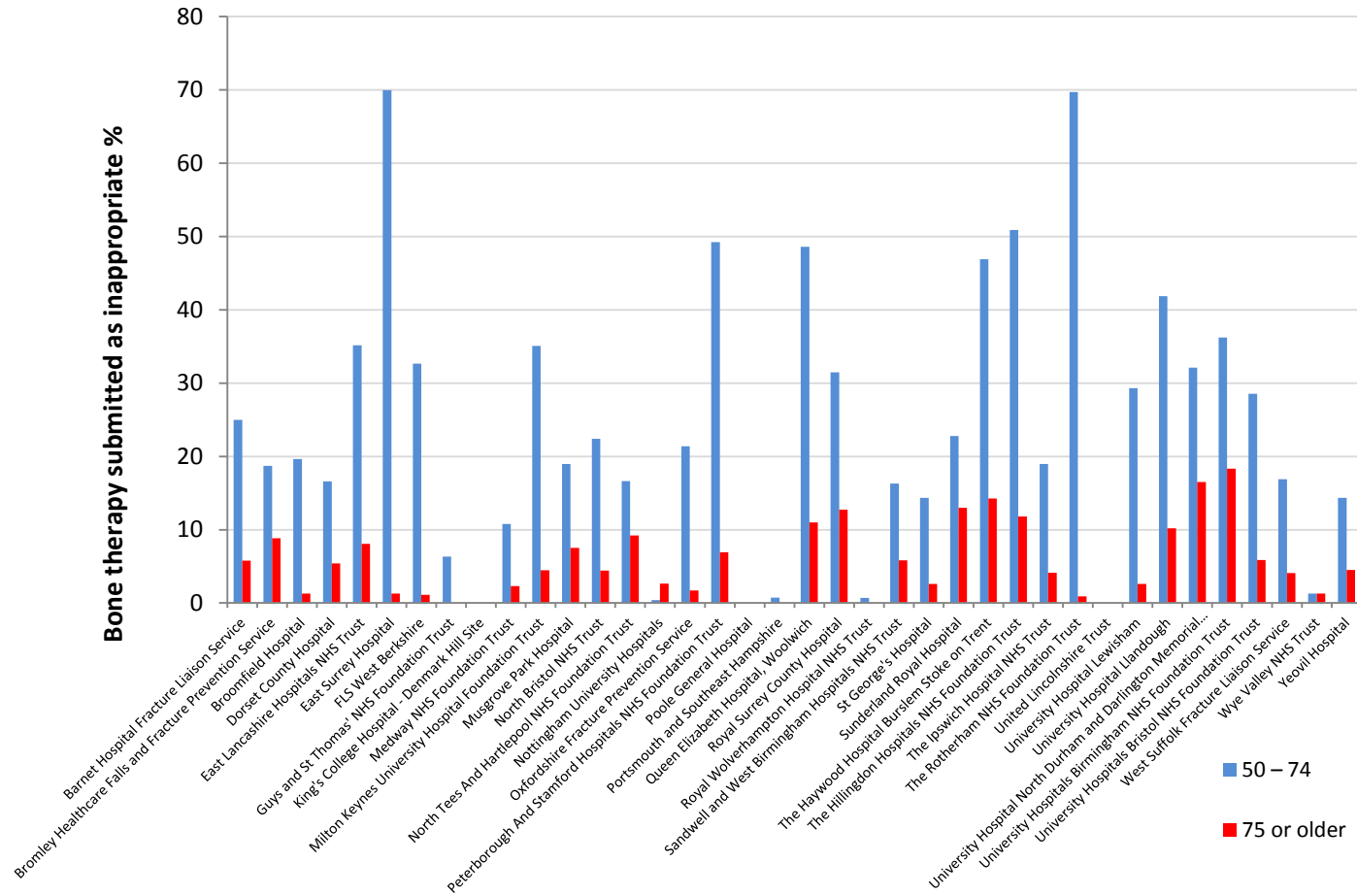
Table 9 Bone therapy recommended after index fracture

Bone therapy	n*	%
Oral bisphosphonates†	2,922	23.8
Raloxifene	6	0
Teriparatide	11	0.1
Strontium	5	0
Denosumab	350	2.9
Zoledronate	216	1.8
Other hormone therapies	1	0
Activated vitamin D	4	0
Patient considered inappropriate for treatment	4,704	38.3
Informed decline	305	2.5
Referred to GP to decide prescription	2,145	17.5
Referred for further clinical opinion	435	3.5
Don't know	1,163	9.5
Overall	12,267	–

*This table does not include those patients where the bone-therapy outcome was missing (n=6,089)

†Alendronate, risedronate and ibandronate are grouped as oral bisphosphonates here

Fig 6 Treatment recommendation that was submitted as inappropriate by age group



Some sites have low rates of 'inappropriate' because of higher rates of missing data

Table 10 Bone therapy recommended after index fracture by each FLS

FLS name	Number of cases submitted	Q4.01 – Bone therapy recommended after index fracture (multiple answers allowed)													
		Treated (oral bisphosphonates [†] , denosumab, zoledronate)		Inappropriate		Informed decline		Referred to GP to decide prescription		Referred for further clinical opinion		Don't know		Missing	
		N	n	%	n	%	n	%	n	%	n	%	n	%	n
Barnet Hospital Fracture Liaison Service	156	63	40.4	48	30.8	6	3.8	0	0	6	3.2	*	*	32	20.5
Bromley Healthcare Falls and Fracture Prevention Service	283	93	32.9	78	27.6	4	1.4	6	2.1	14	4.9	0	0	88	31.1
Broomfield Hospital	382	9	2.6	80	20.9	*	*	251	65.7	21	5.5	0	0	19	5
Dorset County Hospital	536	112	20.9	118	22	*	*	89	16.6	*	*	21	3.9	194	36.2
East Lancashire Hospitals NHS Trust	273	53	19.4	118	43.2	7	2.6	4	1.5	0	0	0	0	91	33.3
East Surrey Hospital	233	56	24	166	71.2	4	1.7	0	0	*	*	*	*	4	1.7
FLS West Berkshire	358	173	48.3	121	33.8	0	0	6	1.4	35	9.8	23	6.4	*	*
Guy’s and St Thomas’ NHS Foundation Trust	284	9	3.2	18	6.3	0	0	0	0	0	0	0	0	257	90.5
King’s College Hospital – Denmark Hill site	79	0	0	0	0	0	0	0	0	*	*	0	0	79	98.7
Medway NHS Foundation Trust	436	37	8.5	57	13.1	0	0	*	*	21	4.8	10	2.1	309	70.9
Milton Keynes University Hospital Foundation Trust	134	16	11.9	53	39.6	*	*	*	*	0	0	3	2.2	59	44
Musgrove Park Hospital	811	305	37.6	215	26.5	64	7.9	190	23.4	*	*	*	*	27	3.3
North Bristol NHS Trust	1,111	46	4.1	298	26.8	80	7.2	384	34.6	11	1	266	23.9	26	2.3
North Tees and Hartlepool NHS Foundation Trust	553	90	16.3	143	25.9	*	*	210	38	29	5.1	0	0	80	14.5
Nottingham University Hospitals	1,250	171	13.7	38	3	0	0	6	0.5	6	0.5	0	0	1,028	82.2
Oxfordshire Fracture Prevention Service	1,210	339	28	280	23.1	0	0	23	1.8	25	2.1	541	44.7	*	*
Peterborough and Stamford Hospitals NHS Foundation Trust	260	23	8.8	146	56.2	8	3.1	77	29.6	*	*	0	0	*	*
Poole General Hospital	69	0	0	0	0	0	0	0	0	0	0	0	0	69	100
Portsmouth and Southeast Hampshire	936	26	2.8	7	0.7	0	0	*	*	3	0.3	*	*	897	95.8

FLS name	Number of cases submitted	Q4.01 – Bone therapy recommended after index fracture (multiple answers allowed)													
		Treated (oral bisphosphonates [†] , denosumab, zoledronate)		Inappropriate		Informed decline		Referred to GP to decide prescription		Referred for further clinical opinion		Don't know		Missing	
		N	n	%	n	%	n	%	n	%	n	%	n	%	n
Queen Elizabeth Hospital, Woolwich	109	22	20.2	65	59.6	*	*	5	4.6	13	11.9	*	*	0	0
Royal Surrey County Hospital	251	45	17.9	111	44.2	6	2.4	24	9.6	18	7.2	12	4.8	35	13.9
Royal Wolverhampton Hospital NHS Trust	285	*	*	*	*	0	0	*	*	0	0	107	37.5	173	60.7
Sandwell and West Birmingham Hospitals NHS Trust	86	7	8.1	19	22.1	0	0	0	0	0	0	0	0	60	69.8
St George's Hospital	725	193	26.6	123	17	0	0	17	2.3	16	2.2	0	0	374	51.6
Sunderland Royal Hospital	584	75	12.8	209	35.8	5	0.9	172	29.5	30	5.1	4	0.7	88	15.1
The Haywood Hospital Burslem Stoke-on-Trent	644	93	14.4	394	61.2	*	*	86	13.4	67	10.6	0	0	0	0
The Hillingdon Hospitals NHS Foundation Trust	110	22	20	69	62.7	4	3.6	0	0	*	*	*	*	12	10.9
The Ipswich Hospital NHS Trust	944	260	27.5	218	23.1	12	1.3	118	12.5	35	3.7	0	0	300	31.8
The Rotherham NHS Foundation Trust	109	*	*	77	70.6	*	*	4	3.7	25	22.9	0	0	0	0
United Lincolnshire Trust	1,218	0	0	0	0	0	0	0	0	0	0	0	0	1,218	100
University Hospital Lewisham	191	28	14.7	61	31.9	*	*	30	15.7	10	5.2	9	4.2	53	27.7
University Hospital Llandough	344	10	2.9	179	52	*	*	49	14.2	*	*	36	10.5	65	18.9
University Hospital of North Durham and Darlington Memorial Hospital	835	172	20.6	406	48.6	25	3	31	3.7	10	1.2	5	0.6	185	22.2
University Hospitals Birmingham NHS Foundation Trust	643	245	38.1	351	54.6	16	2.5	*	*	9	1.2	11	1.7	10	1.6
University Hospitals Bristol NHS Foundation Trust	679	262	38.6	234	34.5	16	2.4	21	3.1	8	1	*	*	138	20.3
West Suffolk Fracture Liaison Service	219	111	50.7	46	21	5	2.3	28	12.8	9	4.1	3	1.4	14	6.4
Wye Valley NHS Trust	231	7	3	6	2.6	0	0	214	92.6	*	*	0	0	*	*
Yeovil Hospital	795	310	39	150	18.9	32	4	94	11.8	3	0.4	104	13.1	100	12.6
Total	18,356	3,488	19	4,704	25.6	305	1.7	2,145	11.7	435	2.4	1,163	6.3	6,089	33.2

Ten FLSs were not able to enter a treatment outcome in over 50% of the patients submitted and so were not graded on their rates of 'inappropriate' and 'don't know'

[†]Alendronate, risedronate and ibandronate are grouped as oral bisphosphonates here

Table 11 **Type of bone therapy recommended by each FLS**

FLS name	Q4.01 – Bone therapy recommended after index fracture (multiple answers allowed)																				
	Alendronate		Risedronate		Ibandronate		Raloxifene		Teriparatide		Strontium		Denosumab		Zoledronate		Other hormone therapies		Activated vitamin D		Total recommended bone therapy
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n
Barnet Hospital Fracture Liaison Service	58	92.1	*	*	0	0	0	0	0	0	0	0	0	0	*	*	0	0	0	0	63
Bromley Healthcare Falls and Fracture Prevention Service	92	97.8	*	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93
Broomfield Hospital	6	60	0	0	0	0	0	0	0	0	0	0	4	40	0	0	0	0	0	0	10
Dorset County Hospital	104	92.9	*	*	0	0	0	0	0	0	0	0	*	*	*	*	0	0	0	0	112
East Lancashire Hospitals NHS Trust	49	92.5	0	0	0	0	0	0	0	0	0	0	0	0	4	7.5	0	0	0	0	53
East Surrey Hospital	53	94.6	*	*	*	*	0	0	0	0	0	0	*	*	0	0	0	0	0	0	56
FLS West Berkshire	173	99.4	*	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	173
Guy's and St Thomas' NHS Foundation Trust	9	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
King's College Hospital – Denmark Hill site	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0
Medway NHS Foundation Trust	36	94.7	*	*	0	0	0	0	0	0	*	*	0	0	0	0	0	0	0	0	38
Milton Keynes University Hospital Foundation Trust	14	93.8	*	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
Musgrove Park Hospital	128	41.4	0	0	0	0	0	0	*	*	*	*	123	39.8	54	17.5	0	0	0	0	309
North Bristol NHS Trust	20	43.5	*	*	*	*	0	0	0	0	0	0	12	26.1	9	19.6	0	0	0	0	46
North Tees and Hartlepool NHS Foundation Trust	87	95.6	*	*	0	0	0	0	*	*	0	0	*	*	*	*	0	0	0	0	91

FLS name	Q4.01 – Bone therapy recommended after index fracture (multiple answers allowed)																				
	Alendronate		Risedronate		Ibandronate		Raloxifene		Teriparatide		Strontium		Denosumab		Zoledronate		Other hormone therapies		Activated vitamin D		Total recommended bone therapy
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n
Nottingham University Hospitals	99	57.6	*	*	0	0	0	0	0	0	0	0	6	3.5	63	36.6	0	0	*	*	172
Oxfordshire Fracture Prevention Service	206	60.4	35	10.3	0	0	*	*	0	0	0	0	98	28.7	0	0	*	*	0	0	341
Peterborough and Stamford Hospitals NHS Foundation Trust	14	56	4	16	0	0	*	*	0	0	0	0	*	*	4	16	0	0	*	*	25
Poole General Hospital	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0
Portsmouth and Southeast Hampshire	26	96.2	*	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26
Queen Elizabeth Hospital, Woolwich	21	91.3	*	*	0	0	*	*	0	0	0	0	0	0	0	0	0	0	0	0	23
Royal Surrey County Hospital	31	68.9	*	*	0	0	0	0	0	0	0	0	10	22.2	*	*	0	0	0	0	45
Royal Wolverhampton Hospital NHS Trust	*	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
Sandwell and West Birmingham Hospitals NHS Trust	5	85.7	*	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
St George's Hospital	173	88.7	*	*	0	0	0	0	*	*	0	0	7	3.6	11	5.6	0	0	0	0	195
Sunderland Royal Hospital	71	93.4	3	3.3	0	0	0	0	0	0	0	0	0	0	*	*	0	0	*	*	76
The Haywood Hospital Burslem Stoke-on-Trent	65	68.4	25	26.3	*	*	*	*	0	0	0	0	0	0	*	*	0	0	0	0	95
The Hillingdon Hospitals NHS Foundation Trust	19	82.6	*	*	0	0	0	0	0	0	0	0	*	*	*	*	0	0	*	*	23
The Ipswich Hospital NHS Trust	235	90	18	6.9	*	*	0	0	0	0	*	*	0	0	6	2.3	0	0	0	0	261
The Rotherham NHS Foundation Trust	*	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*

FLS name	Q4.01 – Bone therapy recommended after index fracture (multiple answers allowed)																				
	Alendronate		Risedronate		Ibandronate		Raloxifene		Teriparatide		Strontium		Denosumab		Zoledronate		Other hormone therapies		Activated vitamin D		Total recommended bone therapy
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n
United Lincolnshire Trust	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0	–	0
University Hospital Lewisham	26	96.4	0	0	0	0	0	0	0	0	0	0	0	0	*	*	0	0	0	0	28
University Hospital Llandough	0	0	0	0	0	0	0	0	*	*	0	0	*	*	7	63.6	0	0	0	0	11
University Hospital of North Durham and Darlington Memorial Hospital	154	89	11	6.4	*	*	*	*	0	0	0	0	*	*	3	1.7	0	0	0	0	173
University Hospitals Birmingham NHS Foundation Trust	190	77.6	26	10.6	*	*	0	0	0	0	0	0	*	*	24	9.8	0	0	0	0	245
University Hospitals Bristol NHS Foundation Trust	235	89.7	12	4.6	*	*	0	0	0	0	0	0	7	2.3	8	3.1	0	0	0	0	262
West Suffolk Fracture Liaison Service	100	87.7	*	*	0	0	0	0	*	*	*	*	6	5.3	4	3.5	0	0	0	0	114
Wye Valley NHS Trust	6	87.5	0	0	0	0	0	0	*	*	0	0	0	0	0	0	0	0	0	0	8
Yeovil Hospital	219	70.2	23	7.4	*	*	0	0	*	*	*	*	62	19.9	5	1.6	0	0	0	0	312
Total (overall)	2,729	77.6	183	5.2	10	0.3	6	0.2	11	0.3	5	0.1	350	10	216	6.1	*	*	*	*	3,515

*Where any n<3, numbers and percentages were suppressed. Where only one site-level figure has been suppressed, the second-lowest number where n<5 has also been suppressed; where the second-lowest number is not n<5, the second-lowest number (any size) has been barnardised (+1/–1) for data protection reasons

Falls assessments and interventions

What proportion of patients are assessed for falls risk factors following a fracture?

Standards:

Older people who present for medical attention because of a fall or report recurrent falls in the past year should be offered a multifactorial falls risk assessment (NICE CG161, NICE QS86, NOS clinical standards for FLSs, BOA The care of patients with fragility fracture).^{6-8,21}

Older people reporting a fall should be considered for strength and balance training (NICE CG161, NICE QS86).^{6,7}

Commentary:

Overall, there was a relatively high missing rate for falls assessment (29%). The proportion of hip fracture patients without record of a falls assessment (60% recorded as not performed, not recorded or missing) was unexpected. This contrasts with data from the 2016 NHFD report (where 97% of hip fracture patients are reported to undergo falls assessment) and, if data are valid, suggests either that FLSs are not aware of falls assessment performed by orthogeriatric teams or that hip fracture teams are incorrectly determining that a multifactorial falls risk assessment has been completed.²⁴

Seven FLSs were able to provide a falls assessment to over 80% of their patients. Eight FLSs returned missing data for over 50% of their patients.

Therapeutic exercise is the best-evidenced intervention for falls prevention. For most patients, it is effective as a single intervention, as well as part of a multifactorial approach. However, only 1% (194/18,356) of patients were recorded as being directly referred by the FLS to a strength and balance programme. Of these patients, 71 were followed up and, by the time of the audit data collection, 42% (30/71) had started their strength and balance programme.

Recommendations:

- FLSs not routinely performing or referring for falls risk assessment should review their current clinical pathway and liaise with other FLSs that are able to meet these criteria to develop a local quality improvement plan.
- FLSs with high missing data proportion rates should review their data entry process and develop a quality improvement plan.

Table 12 Falls risk assessment performed by FLSs

Site of index fracture	Falls risk assessment performed by FLSs														
	No		Yes		Referred for formal medical-led falls clinic assessment		Referred for formal therapy-led falls clinic assessment		Falls assessment recommended in non-FLS primary care		Not recorded		Missing		Total
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n
Hip	1,017	34.4	979	33.1	154	5.2	31	1	13	0.4	23	0.8	738	25	2,955
Vertebral	319	44.4	158	22	8	1.1	9	1.3	25	3.5	18	2.5	181	25.2	718
Non-hip/non-vertebral	5,432	37.8	3,292	22.9	52	0.4	69	0.5	984	6.8	298	2.1	4,241	29.5	14,368
Missing	89	28.3	122	38.7	0	0	11	3.5	22	7	7	2.2	64	20.3	315
Total	6,857	37.4	4,551	24.8	214	1.2	120	0.7	1,044	5.7	346	1.9	5,224	28.5	18,356

Table 13 What proportion of fracture patients had a falls risk assessment after their fracture?

FLS name	Number of cases submitted	Q5.01 Falls risk assessment performed by FLS - all patients							
		Not done		Falls risk assessment done/referred/recommended		Not recorded		Missing	
		N	n	%	n	%	n	%	n
Barnet Hospital Fracture Liaison Service	156	*	*	143	91.7	*	*	9	5.8
Bromley Healthcare Falls and Fracture Prevention Service	283	0	0	283	100	0	0	0	0
Broomfield Hospital	382	358	93.7	6	1.6	0	0	18	4.7
Dorset County Hospital	536	82	15.3	5	0.9	0	0	449	83.8
East Lancashire Hospitals NHS Trust	273	224	82.1	23	8.4	0	0	26	9.5
East Surrey Hospital	233	0	0	231	99.6	0	0	*	*
FLS West Berkshire	358	293	81.8	65	18.2	0	0	0	0
Guy’s and St Thomas’ NHS Foundation Trust	284	0	0	27	9.5	0	0	257	90.5
King’s College Hospital – Denmark Hill site	79	11	13.9	*	*	58	72.2	9	11.4
Medway NHS Foundation Trust	436	129	29.6	4	0.9	0	0	303	69.5
Milton Keynes University Hospital Foundation Trust	134	55	41	63	47	3	2.2	13	9.7
Musgrove Park Hospital	811	244	30.1	534	65.8	0	0	33	4.1
North Bristol NHS Trust	1,111	499	44.9	612	55.1	0	0	0	0
North Tees and Hartlepool NHS Foundation Trust	553	5	0.9	298	53.9	171	30.9	79	14.3
Nottingham University Hospitals	1,250	808	64.6	413	33	*	*	28	2.2
Oxfordshire Fracture Prevention Service	1,210	909	75.1	301	24.9	0	0	0	0
Peterborough and Stamford Hospitals NHS Foundation Trust	260	11	3.8	249	95.8	0	0	*	*
Poole General Hospital	69	41	59.4	28	40.6	0	0	0	0
Portsmouth and Southeast Hampshire	936	6	0.7	*	*	0	0	927	99

FLS name	Number of cases submitted	Q5.01 Falls risk assessment performed by FLS - all patients							
		Not done		Falls risk assessment done/referred/recommended		Not recorded		Missing	
		N	n	%	n	%	n	%	n
Queen Elizabeth Hospital, Woolwich	109	9	9.2	*	*	25	22.9	72	66.1
Royal Surrey County Hospital	251	12	4.8	234	93.2	0	0	5	2
Royal Wolverhampton Hospital NHS Trust	285	3	1.1	3	1.1	7	2.5	272	95.4
Sandwell and West Birmingham Hospitals NHS Trust	86	3	3.5	78	90.7	0	0	5	5.8
St George's Hospital	725	4	0.6	340	46.9	0	0	381	52.6
Sunderland Royal Hospital	584	184	31.5	391	67	9	1.5	0	0
The Haywood Hospital Burslem Stoke-on-Trent	644	597	92.7	17	2.6	26	4	4	0.6
The Hillingdon Hospitals NHS Foundation Trust	110	100	90.9	6	5.5	0	0	4	3.6
The Ipswich Hospital NHS Trust	944	42	4.4	492	52.1	16	1.7	394	41.7
The Rotherham NHS Foundation Trust	109	90	82.6	18	16.5	*	*	0	0
United Lincolnshire Trust	1,218	0	0	0	0	0	0	1218	100
University Hospital Lewisham	191	84	44	61	31.9	*	*	44	23.6
University Hospital Llandough	344	250	72.7	11	3.5	*	*	81	23.5
University Hospital of North Durham and Darlington Memorial Hospital	835	601	72	18	2.2	16	1.9	200	24
University Hospitals Birmingham NHS Foundation Trust	643	272	42.5	369	57.4	*	*	0	0
University Hospitals Bristol NHS Foundation Trust	679	359	52.9	*	*	*	*	314	46.2
West Suffolk Fracture Liaison Service	219	59	26.9	125	57.1	5	2.3	30	13.7
Wye Valley NHS Trust	231	*	*	224	97	*	*	*	*
Yeovil Hospital	795	506	63.6	245	30.8	0	0	44	5.5
Total (overall)	18,356	6857	37.4	5,929	32.3	346	1.9	5224	28.5

*Where any n<3, numbers and percentages were suppressed. Where only one site-level figure has been suppressed, the second-lowest number where n<5 has also been suppressed; where the second-lowest number is not n<5, the second-lowest number (any size) has been barnardised (+1/−1) for data protection reasons

Monitoring contact

What proportions of patients who are on anti-osteoporosis medication are monitored?

Standard:

Patients who are recommended drug therapy to reduce risk of fracture will be reviewed within 4 months of fracture to ensure that appropriate treatment has been started (NOS clinical standards for FLSs).⁸

Commentary:

Fewer than 40% of fracture patients (prescribed anti-osteoporosis medication or referred for further clinical opinion or to GP) had a monitoring contact documented within the audit. One FLS was able to monitor over 80% of their patients, while ten FLSs were able to monitor between 50 and 80% of their patients.

Monitoring may well be the most critical determinant of an FLS's success, given the published poor adherence rates with oral bisphosphonates (up to 60% discontinued by 6 months after initiation).¹⁴ Poor adherence significantly reduces clinical effectiveness. The approval of intermittent parenteral therapies for osteoporosis offers a unique opportunity to address non-adherence. The rate of non-adherence to falls interventions is not known, but is likely to be at least as high as that for oral bisphosphonates. However, monitoring is also likely to be the most challenging aspect for an FLS, as it requires active engagement with patients in the community setting.

The FLS audit monitoring questions contained a high level of missing data (46%) for whether the patient was followed up. For this question, we looked only at patients diagnosed from 1 January to 30 April 2016. This was to allow at least 6 months for the adherence monitoring to be completed by the time that the audit data were collected. The 2015 facilities audit showed that nearly half of FLSs (46%) delegated monitoring to primary care, in which case it becomes almost impossible for hospital-based FLSs to track individual patients and this may account for some of the missing data.²⁰

Of the patients recommended anti-osteoporosis medication by their FLS 771 (22%) were on treatment within the first 4 months.

Recommendations:

FLSs should review links between secondary, primary and community care to share good practice, and produce local quality improvement plans to develop a more structured approach to monitoring of patients on treatment.

Table 14 Proportion of patients followed up in order to monitor medication adherence (of those prescribed anti-osteoporosis medication or referred for further clinical opinion or to GP)

Site of index fracture	Followed up 12–16 weeks after fracture (diagnoses from 1 January to 30 April 2016 only)											
	No		Yes		Uncontactable		Contacted but declined		Patient dead		Missing	
	n	%	n	%	n	%	n	%	n	%	n	%
Hip	121	14.5	254	30.5	30	3.6	5	0.6	25	3	398	47.8
Vertebral	12	4.4	131	47.8	4	1.5	5	1.8	6	2.2	116	42.3
Non-hip/non-vertebral	345	11.9	1,081	37.4	60	2.1	80	2.8	23	0.8	1,303	45.1
Missing	*	*	19	23.5	*	*	*	*	0	0	57	70.4
Total (overall)	480	11.8	1,485	36.4	95	2.3	92	2.3	54	1.3	1,874	45.9

Table 15 Proportion of patients having a 12–16 week monitoring contact (of those prescribed anti-osteoporosis medication or referred for further clinical opinion or to GP)

Q1.01 FLS (diagnoses from 1 January to 30 April 2016 only)	Total patient records	Patients followed up (of those prescribed bone therapy or referred for further clinical opinion or to GP)	
		n	%
Barnet Hospital Fracture Liaison Service	54	45	83.3
Bromley Healthcare Falls and Fracture Prevention Service	78	61	78.2
Broomfield Hospital	209	0	0
Dorset County Hospital	122	0	0
East Lancashire Hospitals NHS Trust	48	30	62.5
East Surrey Hospital	46	0	0
FLS West Berkshire	130	82	63.1
Guy's and St Thomas' NHS Foundation Trust	9	0	0
King's College Hospital – Denmark Hill site	*	0	0
Medway NHS Foundation Trust	44	*	*
Milton Keynes University Hospital Foundation Trust	10	6	60.0
Musgrove Park Hospital	334	246	73.7
North Bristol NHS Trust	294	145	49.3
North Tees and Hartlepool NHS Foundation Trust	230	0	0
Nottingham University Hospitals	128	0	0
Oxfordshire Fracture Prevention Service	227	61	26.9
Peterborough and Stamford Hospitals NHS Foundation Trust	82	0	0
Poole General Hospital	0	0	-
Portsmouth and Southeast Hampshire	18	0	0
Queen Elizabeth Hospital, Woolwich	37	*	*

Q1.01 FLS (diagnoses from 1 January to 30 April 2016 only)	Total patient records	Patients followed up (of those prescribed bone therapy or referred for further clinical opinion or to GP)	
	N	n	%
Royal Surrey County Hospital	52	31	59.6
Royal Wolverhampton Hospital NHS Trust	3	0	0
Sandwell and West Birmingham Hospitals NHS Trust	4	0	0
St George's Hospital	159	25	15.7
Sunderland Royal Hospital	182	55	30.2
The Haywood Hospital Burslem Stoke-on-Trent	165	75	45.5
The Hillingdon Hospitals NHS Foundation Trust	16	8	50.0
The Ipswich Hospital NHS Trust	270	52	19.3
The Rotherham NHS Foundation Trust	25	0	0
United Lincolnshire Trust	0	0	—
University Hospital Lewisham	50	18	36.0
University Hospital Llandough	53	7	13.2
University Hospital of North Durham and Darlington Memorial Hospital	162	78	48.1
University Hospitals Birmingham NHS Foundation Trust	166	113	68.1
University Hospitals Bristol NHS Foundation Trust	162	63	38.9
West Suffolk Fracture Liaison Service	80	61	76.3
Wye Valley NHS Trust	122	*	*
Yeovil Hospital	305	219	71.8
Overall (average)	4,080	1,485	36.4

*Where any n<3, numbers and percentages were suppressed. Where only one site-level figure has been suppressed, the second-lowest number where n<5 has also been suppressed; where the second-lowest number is not n<5, the second-lowest number (any size) has been barnardised (+1/−1) for data protection reasons

Table 16 Time from diagnosis to follow-up assessment

Site of index fracture	Time from diagnosis to follow-up assessment (diagnoses from 1 January to 30 April 2016 only)								
	Up to 12 weeks		12–16 weeks		Over 16 weeks		Missing		Total
	n	%	n	%	n	%	n	%	n
Hip	18	2.2	35	4.2	176	21.1	604	72.5	833
Vertebral	3	1.1	15	5.5	100	36.5	156	56.9	274
Non-hip/non-vertebral	29	1	184	6.4	741	25.6	1,938	67	2,892
Missing	9	11.1	*	*	9	11.1	63	76.5	81
Total (overall)	59	1.4	235	5.8	1,026	25.1	2,760	67.6	4,080

Table 17 Proportion of patients with a valid bone anti-osteoporosis medication recommendation, reported as starting treatment within 4 months of index fracture

FLS name	Total recommended bone therapy	Proportion of patients with a valid bone therapy recommendation, reported as starting treatment within 4 months of index fracture by FLS from January to June 2016	
		N	n
Barnet Hospital Fracture Liaison Service	63	13	20.6
Bromley Healthcare Falls and Fracture Prevention Service	93	83	89.2
Broomfield Hospital	10	0	0.0
Dorset County Hospital	112	0	0.0
East Lancashire Hospitals NHS Trust	53	3	5.7
East Surrey Hospital	56	0	0.0
FLS West Berkshire	173	97	56.1
Guy’s and St Thomas’ NHS Foundation Trust	9	0	0.0
King’s College Hospital – Denmark Hill site	0	0	–
Medway NHS Foundation Trust	38	0	0.0
Milton Keynes University Hospital Foundation Trust	16	4	25.0
Musgrove Park Hospital	309	195	63.1
North Bristol NHS Trust	46	13	28.3
North Tees and Hartlepool NHS Foundation Trust	91	0	0.0
Nottingham University Hospitals	172	0	0.0
Oxfordshire Fracture Prevention Service	341	61	17.9
Peterborough and Stamford Hospitals NHS Foundation Trust	25	0	0.0
Poole General Hospital	0	0	–
Portsmouth and Southeast Hampshire	26	0	0.0
Queen Elizabeth Hospital, Woolwich	23	0	0.0
Royal Surrey County Hospital	45	8	17.8
Royal Wolverhampton Hospital NHS Trust	*	0	*
Sandwell and West Birmingham Hospitals NHS Trust	7	0	0.0
St George’s Hospital	194	*	*
Sunderland Royal Hospital	76	4	5.3
The Haywood Hospital Burslem Stoke-on-Trent	95	0	0.0
The Hillingdon Hospitals NHS Foundation Trust	23	4	17.4
The Ipswich Hospital NHS Trust	261	6	2.3
The Rotherham NHS Foundation Trust	*	0	*

FLS name	Total recommended bone therapy	Proportion of patients with a valid bone therapy recommendation, reported as starting treatment within 4 months of index fracture by FLS from January to June 2016	
	N	n	%
United Lincolnshire Trust	0	0	–
University Hospital Lewisham	28	5	17.9
University Hospital Llandough	11	0	0.0
University Hospital of North Durham and Darlington Memorial Hospital	173	29	16.8
University Hospitals Birmingham NHS Foundation Trust	245	14	5.7
University Hospitals Bristol NHS Foundation Trust	262	67	25.6
West Suffolk Fracture Liaison Service	114	74	64.9
Wye Valley NHS Trust	8	0	0.0
Yeovil Hospital	312	89	28.5
Overall (average)	3,515	771	21.9

Case study 3 – Yeovil Hospital – monitoring patients

Yeovil Hospital sees over 1,500 fragility fracture patients per year (based on 2015 facilities audit data). The Fracture Liaison Team has improved its FLS by implementing systematic follow-up for patients who have been recommended or started on bone-protection treatment. This does not include those who are only recommended calcium and/or vitamin D3. Prior to 2016, only a very few patients seen in the osteoporosis service were followed up. The FLS-DB has enabled systems and processes to be developed to ensure that patients are followed up wherever possible. In the first 6 months of 2016, 71.8% (219) of patients prescribed bone therapy or referred for further clinical opinion or to the GP were followed up within 12–16 weeks.

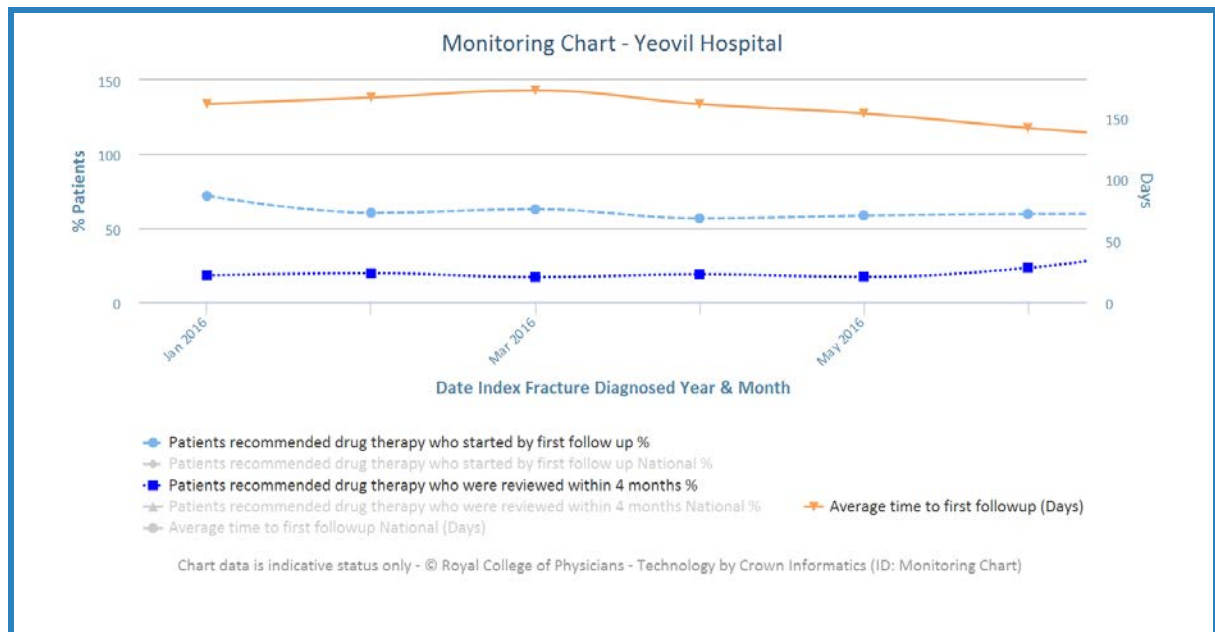
The FLS team, which comprises a band 7 FLS nurse (0.6 WTE) and band 2 and 3 admin (1.8 WTE), works closely with and supports the full-time hip fracture nurse to ensure that hip fracture patients are followed up at 120 days. Firstly, all hip fracture patients who have returned to their own home are telephoned by the hip fracture nurse between 90 and 120 days. If they are not available, they are sent a questionnaire by the administrator. Care home residents and those still in rehabilitation are sent a questionnaire, owing to the difficulty of getting through to the responsible nurse on the telephone. The team have good administrative support to organise the phone calls, questionnaires and enter data. They use the NHFD and FLS-DB to coordinate this follow-up. Without this administrative support, the follow-up would be much more challenging for the clinical team.

A second approach is to work very closely with the DXA practitioner. Currently, because the FLS assessment date can be up to 3 or 4 months after the fracture date, it is often an appropriate time to conduct follow-up with patients when they attend for their DXA scan. The DXA practitioner ensures that any treatment being taken is recorded, checking compliance and adherence with this during the scan appointment.

For all other follow-ups, the team have dedicated administration time to send out follow-up questionnaires and enter these data on the FLS-DB. The administrator systematically searches for the date of FLS assessment and sends out a questionnaire at least 6–8 weeks later, which allows time for the patient to see their GP and to be issued with an initial, and possibly a repeat, prescription for the recommended medication. The team has begun keeping a copy of the letter from the FLS assessment to assist in monitoring adherence. The letter is attached to the patient questionnaire as a reminder of the recommendations made. As well as serving as a memory prompt, this also assists the team in ensuring that the patient is aware of what was recommended. This has helped to prompt some patients to see their GP when they realise that a check is being made and nothing has yet been prescribed.

The team also telephones some patients who are seen in clinic, but this follow-up is increasingly being done via email wherever possible. Questionnaires are sent to those who the team is unable to contact by telephone or email.

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Appendices

Appendix A – Glossary

- A **clinical vertebral fracture** is defined as a clinical episode of care due to the symptoms of the spine fracture.
- A **fracture liaison service (FLS)** is a service that systematically identifies, treats and refers to appropriate services eligible patients aged 50 years and over within a local population who have suffered a fragility fracture, with the aim of reducing their risk of subsequent fractures.
- A **fragility fracture** is a fracture that occurs after low trauma (equivalent to a fall from standing height or less), excluding skull, scaphoid, face and digits.
- **Hospital Episode Statistics (HES)** is a data warehouse containing details of all admissions, outpatient appointments and accident and emergency attendances at NHS hospitals in England.
- **Inappropriate** is defined as inappropriate treatment, for example where the prescription of bone-sparing anti-osteoporosis medication was considered inappropriate for clinical reasons.
- **Monitoring** includes any review performed at the patient level to ascertain anti-osteoporosis medication use, refracture and/or falls.
- The **Patient Episode Database for Wales (PEDW)** records all episodes of inpatient and day case activity in NHS Wales hospitals.
- A **site** is defined as a hospital, primary care practice, network and/or other community service managing fragility fractures.

Appendix B – Audit methods

Recruitment of sites

NHS England has included the FLS-DB audit on its national audit listings, both for essential reporting for trust quality accounts and also for incorporation in the National Clinical Audit Patient Outcomes Programme (NCAPOP). Trusts are required to detail their participation in the audit as part of their annual quality account. Trusts and commissioners are required to supply the resources needed to participate in the FLS-DB.

All FLSs in England and Wales that submitted data for the facilities audit were eligible to participate and were contacted. All members of the FLS Champions Network were also contacted. Members of this network include healthcare professionals of all types who share a specialist interest in FLSs, and healthcare professionals from FLSs based in primary and community settings.

Target patient population

Each FLS was asked to submit data on all patients they saw who were aged 50 or over and who had sustained a fragility fracture that was diagnosed in the NHS between 1 January and 30 June 2016.

NICE technology appraisal (TA) 161, section 2.6, defines a fragility fracture as ‘a fracture sustained as the result of a force equivalent to the force of a fall from a height equal to, or less than, that of an ordinary chair’.⁴ The NICE definition does not exclude any specific fracture sites, although skull, scaphoid, digits and facial fractures have traditionally been excluded.

Governance of the audit

The FLS-DB is part of the Falls and Fragility Fractures Audit Programme (FFFAP), which is commissioned by the Healthcare Quality Improvement Partnership (HQIP) and managed by the Clinical Effectiveness and Evaluation Unit (CEEU) of the RCP. The FLS-DB is supported by a multidisciplinary (rheumatology, endocrinology, gerontology, specialist nurses) and multi-agency advisory group. The advisory group also includes members of the NOS acting as patient advocates, as well as members of the RCP’s Patient and Carer Network. A clinical lead provides direction (Appendix C).

Information governance

Data were collected and processed with specific approval of the secretary of state for health on the recommendation of the Health Research Authority (HRA) Confidentiality Advisory Group (CAG) under the Health Service (Control of Patient Information) Regulations 2002, commonly referred to as section 251 approval.

Dataset development

The FLS-DB advisory group derived indicators from the following evidence-based guidance.

- NICE clinical guideline (CG) 146: *Osteoporosis: assessing the risk of fragility fracture*.³
- NICE TA161: *Alendronate, etidronate, risedronate, raloxifene, strontium ranelate and teriparatide for the secondary prevention of osteoporotic fragility fractures in postmenopausal women*.⁴
- NICE TA204: *Denosumab for the prevention of osteoporotic fractures in postmenopausal women*.⁵
- NICE CG161: *Falls in older people: assessing risk and prevention*.⁶
- NICE quality standard (QS) 86: *Falls in older people*.⁷
- National Osteoporosis Society: *Clinical standards for fracture liaison services*.⁸
- British Orthopaedic Association: *The care of patients with fragility fracture*.²¹
- International Osteoporosis Foundation: *Capture the fracture best practice framework*.²²

The proposed dataset was presented, and feedback received, at an FLS Champions Network meeting in February 2015. The dataset was further refined and discussed at three launch events that took place in November and December 2015 and, through an iterative process with the advisory group, a dataset of 63 fields or data points was defined. A document mapping the dataset to the evidence-based guidance is available online at www.rcplondon.ac.uk/fffap.

Previous audits

Throughout 2014, the FLS-DB feasibility study was run in 21 services to find out whether it is possible to determine:

- an accurate estimate of the incidence of fragility fracture in a locality
- whether patients who have sustained a fragility fracture can be identified in GP records
- whether patients who are assessed and treated for osteoporosis and falls risk can be identified in GP records
- whether the records of patients' fragility fractures can be matched across GP records and FLS databases.

In response to information governance challenges regarding access to identifiable records, the feasibility study also investigated whether opt-in GP practice-level consent was achievable for release of patient data to an FLS-DB.

The feasibility study demonstrated that, in principle, a national FLS-DB across primary and secondary care is able to answer the basic critical questions on the management and appropriate follow-up of patients who sustain a fragility fracture. A useful method of estimating the expected number of fractures (the denominator) was developed, but work is required to continue refining its accuracy. Data about fragility fractures can be extracted from primary care databases, but there are severe limitations on their completeness, and also some uncertainty, in particular about how the date of fracture is recorded. Information governance restrictions made it necessary for us to attempt an opt-in model of GP consent. This proved unworkable and therefore assessment of data linkage between FLSs and general practice could not be carried out adequately.

The key recommendation from the feasibility study was to focus on an organisational and clinical audit of FLSs, but not to pursue linkage with primary care information systems at this time.²³

Data entry and analysis

All data were entered into a secure webtool, which was designed so that each site could log in with an individual password and site code. Data could be entered directly for each patient or uploaded from an existing legacy database. The webtool validated the data at the point of entry and provided an import log for rejected records, as well as records accepted with serious and minor errors. Data items were required from identification to monitoring of patients, and records were able to be updated either directly or in subsequent uploads.

Data analysis was conducted by the FFFAP data coordinator and the Clinical Effectiveness Unit (CEU) of the Royal College of Surgeons of England. The FLS-DB advisory group was consulted to identify key findings and recommendations.

FLS-level results are presented throughout the report. We chose to use colour coding for specific proportions of 0–49% (red), 50–79% (amber) and 80–100% (green) achieving the specified standard. For data completeness, six fields were mandatory, leaving 25 non-mandatory fields. Colour coding to identify data completeness levels was labelled as red for 13–25 fields incomplete, amber for 6–12 incomplete and green for 0–5 incomplete.

Small numbers policy

Where any 'n' was <3, numbers and percentages were suppressed. Where only one site-level figure has been suppressed, the second-lowest number where n<5 has also been suppressed; where the second-lowest number is not n<5, the second-lowest number has been barnardised (+1/–1) for data protection reasons.

Limitations

Data were self-reported by participating sites and so the report findings are dependent upon the validity of the submitted data. National coverage of secondary fracture prevention using FLSs is still low. The audit lacked data submissions from 116 acute trusts and known FLSs based in non-acute settings. This includes seven FLSs that submitted too few patients to reflect meaningful participation in the audit. No primary care-based FLS was able to submit patient-level data to the audit and only one was able to provide aggregate data (Appendix B). The acute trusts listed as not participating in this audit in Table 20 may not have a commissioned FLS, or the FLS may be provided in a community or primary care setting.

Appendix C – Data from the Bone Protection Service York (a primary care-based FLS)

Background

The Bone Protection Service York is based out of GP practices. Patients are identified via a discharge letter following a fracture. A treatment template has been developed to support GPs or practice nurses through the treatment pathway. Clinicians are directed to patient information and relevant potential on-ward referral destinations (ie community therapy, exercise referral schemes). The template has a built-in recall at 4 and 12 months to ensure that the patient is contacted and that adherence is checked.

Methods

An IT template based on the patient pathway was developed for use in the patient record. This followed a stepped approach (with payment attached at each stage):

- 1 identification of patients suitable for the service
- 2 a bone health assessment
- 3 an appointment at 4 months to check adherence
- 4 a 12-month review.

In order to assess the activity in its first year, payment requests for each pay point were analysed. In addition, a search was written for the clinical systems to ascertain more detail about the treatment pathway. These data were then compared with predicted numbers from the following two sources.

- An audit conducted by York Teaching Hospital, following a 2-year FLS pilot (ending January 2013). This predicted that 760 patients would be eligible for this service.
- The NOS Benefits Calculator.² This predicted (over 2014/15) that 1,584 patients would be eligible for this service.

These estimations of activity were then weighted by each practice's patient populations aged over 50 to ascertain a prediction of activity per practice. In addition, a survey was conducted to assess the usability of the processes within the service.

Results

According to payment requests from the first year of activity, the Bone Protection Service York treated 406 patients – 26% of the NOS-predicted figure (Fig 7). Analysis found considerable variation across practices (Table 18). The searches established that, in the first year, 44% of all fractures coded on the clinical systems were subsequently coded as fragility fractures.

- Of these, only 40% went on to have a bone health assessment.
- 27% of this cohort had a 4-month follow-up.

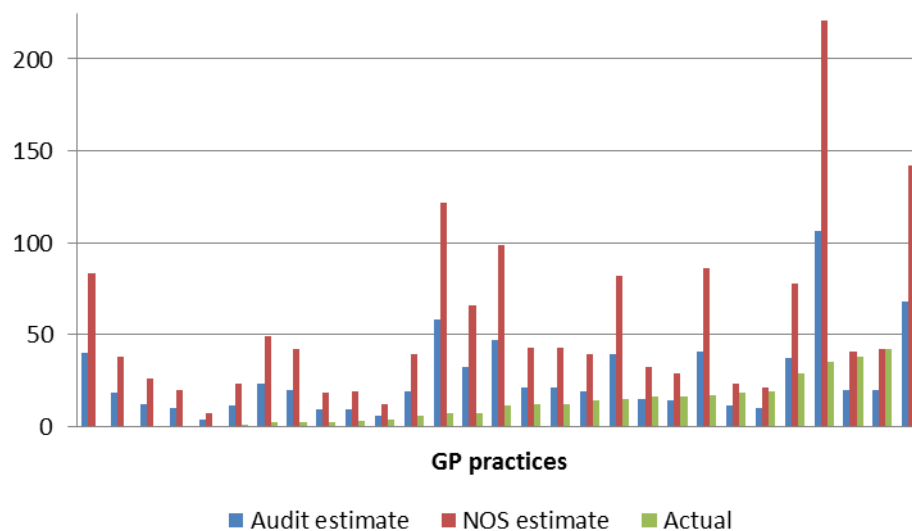
A more detailed search completed by 11 practices (to date) showed that, out of 416 patients with a fragility fracture code:

- 38% (150) had a DXA scan.
- Only 32% (134) had a bone health assessment. Of these, 40 were prescribed bisphosphonates, of which 30 had these prescribed for the first time.

The usability survey (40% response rate) found:

- where the service was implemented successfully, patients are seen by one or two lead clinicians
- 54% of responses highlighted that the administrative processes were too complicated, contributing to a low take-up of the service.

Fig 7

Number of patients reported as having an initial bone health assessment

For individual practices, the figure shows the actual number of patients who have been reported as having an initial bone health assessment through the Bone Protection Service York, compared with the predicted numbers from the York Teaching Hospital Audit and the latest NOS-predicted figures, giving estimated figures by practice (weighted for their populations aged 50 years and over)

Table 18 The number of patients seen for a bone health assessment through the Bone Protection Service York, compared with the predicted figures using the York Teaching Hospital audit and the NOS prediction tools

Cohort 50+	Audit estimate	NOS estimate	Actual	% of actual activity from NOS estimate
127,845	760	1,584	406	25.6

Appendix D – Structure and governance

FLS-DB advisory group

Jonathan Bayly, visiting professor of osteoporosis and falls management, Royal College of General Practitioners

Kate Bennett, physiotherapist, AGILE and Chartered Society of Physiotherapy

Chris Boulton, FFFAP programme manager

Rachel Bradley, consultant in care of the elderly, British Geriatrics Society

Will Carr, service development project manager, National Osteoporosis Society

Gavin Clunie, consultant rheumatologist and metabolic bone physician, British Society for Rheumatology

Clare Cockill, osteoporosis and fracture liaison nurse specialist, Royal College of Nursing

Frances Dockery, consultant physician, British Geriatrics Society

Neil Gittoes, consultant endocrinologist and associate medical director, Society for Endocrinology

Celia Gregson, consultant senior lecturer and Arthritis Research UK clinician scientist and honorary consultant orthogeriatrician, University of Bristol

Catherine Gallagher, FLS-DB and Falls project coordinator

Xavier Griffin, consultant orthopaedic trauma surgeon, British Orthopaedic Association

Debbie Jannaway, consultant nurse for falls and osteoporosis and patient safety, Royal College of Nursing

M Kassim Javaid, associate professor in metabolic bone disease, Oxford NIHR Musculoskeletal BRU, University of Oxford and FLS-DB clinical lead

Tim Jones, commissioning adviser, National Osteoporosis Society

Finbarr Martin, FFFAP programme chair and clinical lead

Iona Price, Patient and Carer Network, RCP

Sunil Rai, FFFAP data coordinator

Jo Sayer, development project manager, National Osteoporosis Society

Alison Smith, patient representative, National Osteoporosis Society

David Stephens, locum and portfolio GP, Royal College of General Practitioners

Sonya Stephenson, service development project manager, National Osteoporosis Society

Naomi Vasilakis, FLS-DB and Falls project manager

Helen Williams, innovation and improvement manager, NHS Vale of York CCG

FFFAP board

Chris Boulton, FFFAP programme manager, RCP

Vivienne Burgon, NHFD project manager, RCP

Tim Chesser, British Orthopaedic Association

David Cromwell, Clinical Effectiveness Unit, Royal College of Surgeons of England

M Kassim Javaid, FLS-DB clinical lead

Antony Johansen, NHFD clinical lead, orthogeriatric medicine

Finbarr Martin, FFFAP programme chair and clinical lead

Shelagh O'Riordan, Falls Workstream clinical lead

Roz Stanley, Clinical Effectiveness and Evaluation Unit (CEEU) operations director, RCP

Kevin Stewart, CEEU clinical director, RCP

Anne Thurston, National Osteoporosis Society

Naomi Vasilakis, FLS-DB and Falls project manager

Rob Wakeman, NHFD clinical lead, orthopaedic surgery

Jane Youde, British Geriatrics Society

Appendix E – Non-participating trusts

Table 19 Trusts not included in report (excluded/not participating)

Sites not in patient report	
EXCL	Abertawe Bro Morgannwg University Health Board
*	Aintree University Hospital NHS Foundation Trust
	Airedale NHS Foundation Trust
*	Aneurin Bevan Health Board
EXCL	Anglian Community Enterprise (CIC)
*	Ashford and St Peter's Hospitals NHS Foundation Trust
	Barking, Havering and Redbridge University Hospitals NHS Trust
	Barnsley Hospital NHS Foundation Trust
	Barts Health NHS Trust
**	Basildon and Thurrock University Hospitals NHS Foundation Trust
	Bedford Hospital NHS Trust
*	Betsi Cadwaladr University Local Health Board
	Blackpool Teaching Hospitals NHS Foundation Trust
	Bolton NHS Foundation Trust
*	Bone Protection Service, NHS Vale of York CCG
*	Bradford Teaching Hospitals NHS Foundation Trust
	Brighton and Sussex University Hospitals NHS Trust
EXCL	Buckinghamshire Healthcare NHS Trust
*	Burton Hospitals NHS Foundation Trust
	Calderdale and Huddersfield NHS Foundation Trust
EXCL	Cambridge University Hospitals NHS Foundation Trust
	Central Manchester University Hospitals NHS Foundation Trust
	Chelsea and Westminster Hospital NHS Foundation Trust
*	Chesterfield Royal Hospital NHS Foundation Trust
	Colchester Hospital University NHS Foundation Trust
	Countess of Chester Hospital NHS Foundation Trust
*	Crawley CCG FLS West Sussex
EXCL	Croydon Health Services NHS Trust
**	Cwm Taf NHS Trust
**	Dartford and Gravesham NHS Trust
EXCL	Derby Hospitals NHS Foundation Trust
	Doncaster and Bassetlaw Hospitals NHS Foundation Trust
	East and North Hertfordshire NHS Trust
	East Cheshire NHS Trust
*	East Kent Hospitals University NHS Foundation Trust
	East Sussex Healthcare NHS Trust
*	Epsom and St Helier University Hospitals NHS Trust
	Frimley Health NHS Foundation Trust
	Gateshead Health NHS Foundation Trust
	George Eliot Hospital NHS Trust
*	Gloucestershire Care Services NHS Trust
	Gloucestershire Hospitals NHS Foundation Trust

Fracture Liaison Service Database (FLS-DB) clinical audit. April 2017

**	Great Western Hospitals NHS Foundation Trust
	Hampshire Hospitals NHS Foundation Trust
**	Harrogate and District NHS Foundation Trust
	Heart of England NHS Foundation Trust
	Hinchingbrooke Health Care NHS Trust
	Homerton University Hospital NHS Foundation Trust
	Hull and East Yorkshire Hospitals NHS Trust
**	Hywel Dda Local Health Board
	Imperial College Healthcare NHS Trust
	Isle of Wight NHS Trust
**	James Paget University Hospitals NHS Foundation Trust
	Kettering General Hospital NHS Foundation Trust
**	Kingston Hospital NHS Foundation Trust
	Lancashire Teaching Hospitals NHS Foundation Trust
**	Leeds Teaching Hospitals NHS Trust
	London North West Healthcare NHS Trust
**	Luton and Dunstable University Hospital NHS Foundation Trust
**	Maidstone and Tunbridge Wells NHS Trust
	Mid Cheshire Hospitals NHS Foundation Trust
**	Mid Yorkshire Hospitals NHS Trust
*	Newcastle upon Tyne Hospitals NHS Foundation Trust
**	Norfolk and Norwich University Hospitals NHS Foundation Trust
	North Cumbria University Hospitals NHS Trust
	North Middlesex University Hospital NHS Trust
**	Northampton General Hospital NHS Trust
*	Northern Devon Healthcare NHS Trust
*	Northern Lincolnshire and Goole NHS Foundation Trust
	Northumbria Healthcare NHS Foundation Trust
EXCL	Nottingham City Care Partnership CIC EXCL
**	Pennine Acute Hospitals NHS Trust
**	Plymouth Hospitals NHS Trust
	Royal Berkshire NHS Foundation Trust
	Royal Cornwall Hospitals NHS Trust
**	Royal Devon and Exeter NHS Foundation Trust
	Royal Liverpool and Broadgreen University Hospitals NHS Trust
*	Royal United Hospitals Bath NHS Foundation Trust
*	Salford Royal NHS Foundation Trust
*	Salisbury NHS Foundation Trust
**	Sheffield Teaching Hospitals NHS Foundation Trust
	Sherwood Forest Hospitals NHS Foundation Trust
	Shrewsbury and Telford Hospital NHS Trust
	South Devon Healthcare NHS Foundation Trust
*	South Tees Hospitals NHS Foundation Trust
**	South Tyneside NHS Foundation Trust
**	South Warwickshire NHS Foundation Trust
	Southend University Hospital NHS Foundation Trust

	Southport and Ormskirk Hospital NHS Trust
**	St Helens and Knowsley Hospitals NHS Trust
**	Stockport NHS Foundation Trust
*	Sussex Community NHS Trust
	Tameside Hospital NHS Foundation Trust
	The Dudley Group NHS Foundation Trust
	The Newcastle Upon Tyne Hospitals NHS Foundation Trust
	The Princess Alexandra Hospital NHS Trust
**	The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust
	The Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust
**	The Whittington Hospital NHS Trust
	University College London Hospitals NHS Foundation Trust
	University Hospital of South Manchester NHS Foundation Trust
**	University Hospital Southampton NHS Foundation Trust
	University Hospitals Coventry and Warwickshire NHS Trust
**	University Hospitals of Leicester NHS Trust
**	University Hospitals of Morecambe Bay NHS Foundation Trust
	University Hospitals of North Midlands NHS Trust
	Walsall Healthcare NHS Trust
	Warrington and Halton Hospitals NHS Foundation Trust
	West Hertfordshire Hospitals NHS Trust
	West Middlesex University Hospital NHS Trust
	Western Sussex Hospitals NHS Foundation Trust
	Weston Area Health NHS Trust
	Wirral University Teaching Hospital NHS Foundation Trust
	Worcestershire Acute Hospitals NHS Trust
	Wrightington, Wigan and Leigh NHS Foundation Trust
	York Teaching Hospital NHS Foundation Trust

EXCL = excluded owing to less than 50 cases

*Sites with an FLS that have submitted facilities audit data, but not patient audit data

**Sites that submitted facilities audit data, but do not have an FLS

This report provides the first ever benchmark for the performance of FLSs at the patient level and is the next step in understanding current secondary fracture prevention care in England and Wales.

The FLS-DB aims to provide sites with the data that they need to improve their services and demonstrate their efficiency.

Falls and Fragility Fracture Audit Programme (FFFAP)

A suite of linked national clinical audits, driving improvements in care; managed by the Royal College of Physicians

- > **Falls Pathway Workstream**
- > **Fracture Liaison Service Database (FLS-DB)**
- > **National Hip Fracture Database (NHFD)**

