

Fracture Liaison Services: the UK experience

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Abstract Fracture Liaison Services (FLS) have been shown to deliver clinically and cost-effective osteoporosis care for patients presenting to hospital with fragility fractures. During the first decade of the new millennium, a consensus emerged in the UK on the need for universal access to FLS. This presentation described constructive interactions between policy makers, professional organizations, patients and their associations, and pharmaceutical manufacturers that led to the incorporation of FLS into national policy and guidance.

Keywords Fracture liaison service · Secondary prevention · Policy · Osteoporosis · Quality of care

Introduction

Thank you very much for this opportunity to share with you an experience from the UK of developing a consensus on systematic approaches to fragility fracture prevention. Over the last decade, this consensus has emerged as a result of constructive interactions between policy makers, professional organizations, patients and their associations, and the pharmaceutical industry. The UK consists of four countries: England, where the majority of the population resides (51 million); Scotland (5 million); Wales (3 million), and Northern Ireland (1.7 million). This presentation focuses primarily on England from a policy development perspective because it is

the largest population sector. However, it should be noted that Scotland was the birth place of the Fracture Liaison Service model, and national strategies akin to the English policy have been developed in the three devolved countries.

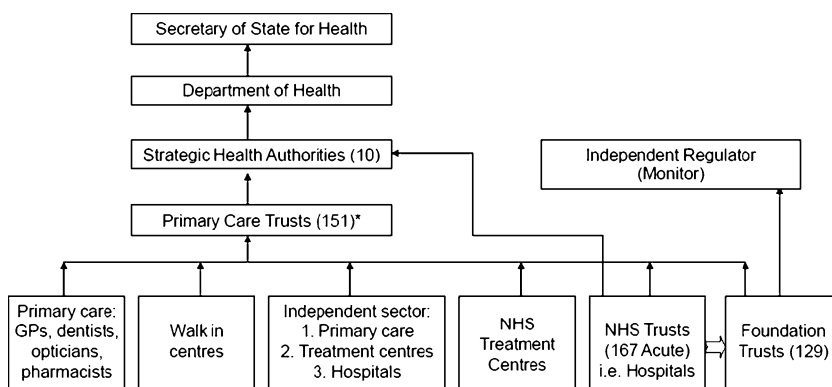
The UK system is a publicly funded single payer system which could be viewed as a socialized version of the Kaiser Permanente system in the USA. The structure of the National Health Service (NHS) in England for the last decade is illustrated in Fig. 1 (n.b. considerable reform to this structure was ongoing at the time of this presentation). The Department of Health is responsible for “funding, directing, and supporting the NHS”; ten regional Strategic Health Authorities are responsible for “managing monitoring and improving local services”; and 151 local primary care organizations (Primary Care Trusts or PCTs) are responsible for “assessing local needs and commissioning care” [1]. The PCTs have been responsible for the deployment of 80% of the GBP£100 billion (US \$160 billion, € 117 billion) annual NHS budget.

Recent surveillance data indicate that as a population, we are aging: over 5% of the population is over 80 years of age. Indeed, the 2008 population estimates for the first time report that there were more people of retirement age (60–65 years old) than under 16 years of age [2]. Nineteen percent of the population is represented by men aged over 65 and women aged over 60 years. Those aged over 80 years are the fastest growing subgroup, accounting for 5% (2.7 million individuals) of the population. This represents an increase of 1.2 million of such individuals since 1981. As with other countries, our demography is shifting which has important implications for fracture care. This is illustrated by the year-on-year increase in the absolute number of hip fracture admissions. During the period 1998–2008, the number of admissions relating to hip fracture among over 60-year-olds in England increased from circa 56,000 to 65,000 cases per year [3].

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Fig. 1 Structure of the National Health Service in England



Fracture case finding

A substantial literature has emerged over this last decade calling for closure of the secondary fracture prevention management gap [4–6]. In the UK, we began to take proactive steps in 2003 when the British Orthopaedic Association published the first “Blue Book” on the care of fragility fracture patients [7]. In 2007, a second edition of the Blue Book [8] was published to coincide with the launch of the National Hip Fracture Database [9]. Both of these initiatives were jointly led by the British Orthopaedic Association and the British Geriatrics Society. We have known since 1980 that approximately half of hip fracture sufferers have experienced prior fragility fractures [10]. More recent studies from Australia [11], UK [12], and USA [13] have confirmed these findings for current hip fracture sufferers. Figure 2 attempts to make these data accessible to generalists in the healthcare system, be they primary care providers or those who commission acute- and long-term services in the NHS [8, 14]. This figure shows, for example, that we can divide the entire postmenopausal population into those women who have a fracture history (above the dotted line) and those women who have yet to suffer a fracture (below the line). We can also use fracture risk assessment tools [15] in the primary prevention

population, where it is likely that some of those individuals are at high risk for fractures.

This approach combines the ease of case finding with fracture risk stratification. In the UK, there are approximately 11 million women who are aged over 50. Estimates from various national and international epidemiological studies report that approximately 16% of those women have suffered a prior fracture, likely to be a fragility fracture, since the age of 50 [8]. Conversely, 84% of the postmenopausal population has not suffered a fracture. Given that 50% of hip fracture sufferers have fractured before, 16% of the postmenopausal population will provide us with 50% of future hip fracture cases. Patients experiencing new fragility fractures will present to medical services, be it hospital emergency departments or community-based fracture units, thus providing an opportunity for an intervention. Case finding of patients in the second stratum of the pyramid, those that suffered a fragility fracture in the past, can be undertaken proactively or reactively. If a doctor or allied healthcare professional can ask the question, “Have you experienced a fracture Madam?” and a patient can remember (and studies have indicated that they generally do [16–18]), this provides a simple case finding strategy to identify fragility fracture patients that may not have received osteoporosis assessment at the time their prior fracture occurred [8, 14].

Fig. 2 Case finding and fracture risk pyramid

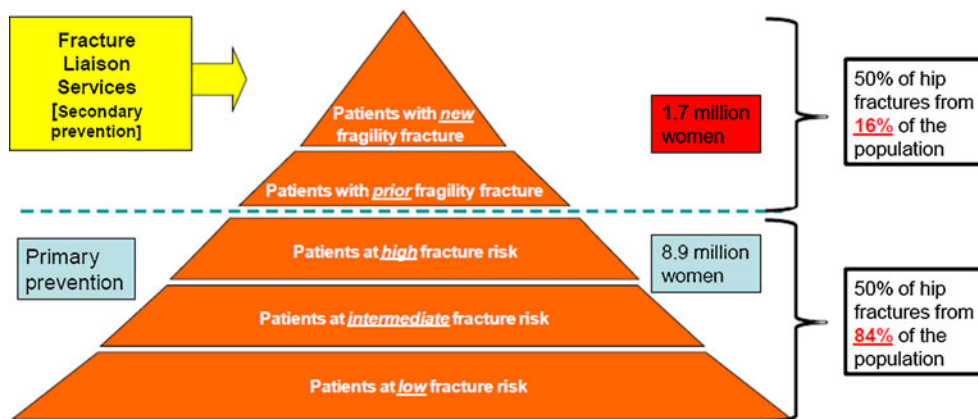
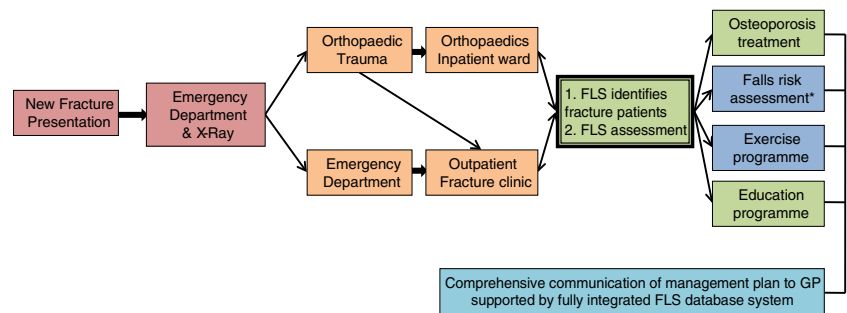


Fig. 3 Fracture Liaison Service model

Fracture Liaison Service model

The *Fracture Liaison Service (FLS)* model was first established in the teaching hospitals of Glasgow, Scotland in the late 1990s. Several publications from Drs. McLellan and Gallacher, endocrinologists, describe in greater detail the service structure illustrated above in Fig. 3 [19, 20]. This “doctor-light” model offers post-fracture services to all individuals over 50 years of age who present with a fragility fracture at a hospital. Skull fractures, high impact fractures, and some of the more trivial fractures could be excluded, however, an inclusive strategy is generally adopted. The model works as follows:

- FLS is delivered by a nurse specialist supported by a lead clinician in osteoporosis.
- The nurse specialist identifies patients with new fragility fractures who are either admitted to the orthopedic inpatient ward or who are managed as outpatients through the fracture clinic.
- The nurse specialist arranges for appropriate patients to attend the “one stop” FLS clinic where bone density is measured by a DXA scanner to assess future fracture risk.
- After the bone scan, the nurse specialist takes the patient’s history, provides lifestyle advice, and, based on tight protocols agreed with local general practice, osteoporosis treatment will be triggered.
- Older patients, where appropriate, are referred onto the local falls prevention service to implement interventions to reduce the risk of falling in line with national guidance [21, 22].

While the vast majority of cases are managed by the nurse specialist, between 10% and 15% of the very complex secondary cases are referred to the endocrinologists’ specialist Mineral Metabolism Clinics.

A national audit of secondary fracture prevention was undertaken across Scotland [12]. This work reported that centers operating an FLS delivered secondary preventive care to 95% of wrist fracture patients (versus <30% for other service structures) and 97% of hip fracture patients (versus <40% for other service structures). Recently, an independent review of the impact of the Glasgow Osteo-

porosis and Falls Strategy for the period 1998–2008 reported that hip fracture rates in the city had reduced by 7.3% over the decade [3]. During the same period, hip fracture rates for the entire population of England had increased by almost 17%. These findings are broadly consistent with observational data reported by Dell and colleagues for the Kaiser Healthy Bones Program in the USA [23] and randomized control trial data reported by Majumdar and colleagues from Canada [24, 25].

Incorporation of FLS into professional organization and patient society guidance

Harrington’s insightful description of secondary preventive care underpins the need for the development of the Fracture Liaison Service model [26]:

“Osteoporosis care of fracture patients has been characterized as the Bermuda Triangle made up of orthopaedists, primary care physicians, and osteoporosis experts into which the fracture patient disappears.”

The evolution of this program began with two parallel and simultaneous efforts to educate orthopedic surgeons and general practitioners (GP). Indeed, UK surveys of these providers reported that both groups agreed that secondary fracture prevention is critical [27]. However, the orthopedic surgeons’ position was that GPs’ forte is long-term condition management, so naturally the GP should be responsible for delivering fracture prevention care. The GPs’ response was that they would wait for the orthopedic surgeons to suggest a line of treatment. In the absence of a liaison mechanism, the osteoporosis experts, in this case endocrinologists and their specialist teams, would have no reason to interact with fracture patients during their hospital stay or outpatient clinic appointments. Thus, approximately 800–1,000 fracture patients that present to the average district general hospital every year were falling into a care gap.

From 2003, when the first Blue Book [7] was published, to 2007 insufficient progress had been made in terms of transforming the standard of care for fragility fracture patients. This stimulated the publication of the second

edition of the Blue Book mentioned previously [8]. The second Blue Book (Blue Book 2) represented the first really tangible step to achieve consensus among all stakeholders at a national level. The majority of relevant professional organizations endorsed the document including orthopedics, geriatrics, endocrinology, public health, nursing, anesthetists, and the UK National Osteoporosis Society. The multidisciplinary authorship group included representatives from all of these constituencies and, crucially, UK general practice. The Blue Book 2 highlights the need for consistent delivery of high-quality fracture care and provides a declaration of interdependence that no one specialty is able to tackle this systems-based problem alone. Blue Book 2 explicitly calls for the establishment of an integrated Fracture Liaison Service in every UK hospital, which operates in close collaboration with local general practice, "...to offer the optimal system of healthcare delivery to implement National Institute of Clinical Excellence (NICE)¹ guidance consistently for all patients presenting with fragility fractures."

The UK National Osteoporosis Society (NOS) played a central role in catalyzing the development of national policy. In 2009, the NOS Manifesto—*Protecting Fragile Bones* for England, Scotland, Wales, and Northern Ireland—was published and launched to politicians at events in the four national parliaments [28]. The NOS Manifesto makes a case to focus on five priority areas to improve bone health in the UK, the first of which being:

"We want a Fracture Liaison Service linked to every hospital that receives fragility fractures in the UK, to ensure that every fragility fracture patient gets the treatment and care they need."

The NOS Manifesto was drafted by staff from the charity and scientific advisors including several members of the authorship group of Blue Book 2 and was prompted by findings from national audit of secondary preventive care. The Royal College of Physicians national audit of falls and bone health [29] began with an audit of the organization of service structures in hospitals in Q4-2005. At this time, 27% of hospitals reported having a fracture liaison nurse in post [30]. The organizational audit was repeated 3 years later and found that by Q4-2008 this had only increased to 29% [31]. The audit made two major recommendations:

1. Primary Care Organizations should develop commissioning strategies that include:
 - a. Case finding systems in hospital and community settings to identify high risk fallers;

- b. Adherence to NICE treatment guidelines with monitoring by local audit;
 - c. Clinical leaders including a consultant with job plan commitment;
 - d. A Fracture Liaison Service;
 - e. Widespread and accessible evidence-based exercise programs; and
 - f. Targeted use of validated home safety assessments.
2. The Department of Health in England should review how it can best support these developments by:
 - a. Providing advice on commissioning;
 - b. Strengthening incentives; and
 - c. Providing useful metrics for falls prevention, fractures, and osteoporosis treatments.

Incorporation of FLS into Department of Health policy

In 2008, the professional organizations and the National Osteoporosis Society made the case to the Secretary of State for Health that specific guidance was required for the commissioners of services in the NHS to enable closure of the care gap revealed in the national audits. In response to this case, the Secretary of State commissioned the National Clinical Director for Older People to establish a Department of Health working group on falls and fractures to draft the policy [32]. A component of the Department of Health's Prevention Package for Older People, *Falls and Fractures: Effective Interventions in Health and Social Care*, was published in July 2009 [33]. This policy document provides a roadmap for a systematic approach to falls and fracture prevention that incorporates four key objectives:

1. Improve outcomes and efficiency of care after hip fractures by following the six professional standards described in Blue Book 2;
2. Respond to the first fracture, prevent the second through Fracture Liaison Services in acute (i.e. hospital) and primary care;
3. Early intervention to restore independence through falls care pathway linking acute and urgent care services to secondary falls prevention; and
4. Prevent frailty, preserve bone health, and reduce accidents—through preserving physical activity, healthy lifestyles, and reducing environmental hazards.

Through this process, the Department of Health has effectively mapped specific patient groups to specific health-care delivery programs to implement specific policies. Self-evidently, consensus is at the heart of this national effort.

On December 2009, the Department of Health also published a pragmatic economic evaluation which modeled the costs and benefits of establishing a Fracture Liaison

¹ NICE is an independent organization responsible for developing clinical guidelines and providing national guidance on promoting good health and preventing and treating ill health.

Service, to reduce the risk of secondary fractures among older people [34]. The analysis reported that "... over a 5 year period GBP£291k (US\$417k, Euro 340k) is saved in NHS acute (i.e. hospital) and community services and local authority social care costs, against an additional GBP£234k (US\$379k, Euro 274k) revenue costs (falling both in year 1 and covering drug therapy for 5 years spent by the NHS on this patient cohort). This is based on an annual patient cohort of 797 hip, humerus, spine and forearm fractures, anticipated from a 320,000 population. At a national level, this equates to approximately GBP£8.5 Million (US\$14 Million, Euro 10 Million) in savings over 5 years."

The National Hip Fracture Database

Blue Book 2 [8] made the case for a systematic approach to hip fracture care and prevention. As described previously, chapter 2 of Blue Book 2 was concerned with the delivery of effective secondary prevention for patients presenting with fragility fractures at any skeletal site. Chapter 1 focuses on ortho-geriatric care of hip fracture patients specifically, making the case for optimal pre-, peri-, and postoperative care of hip fracture patients. Six professional standards of care are advocated. In order to evaluate adherence to these standards of care, the National Hip Fracture Database (NHFD) was launched in parallel to the publication of Blue Book 2 in September 2007 [9].

The NHFD is intended to focus attention on hip fracture both locally and nationally, benchmark its care across the country, and use continuous comparative data to create a drive for sustained improvements in clinical standards and cost-effectiveness. All but two of the 200 hospitals in England, Wales, and Northern Ireland had subscribed to the database when this presentation was delivered (which has since reached 100%). The pharmaceutical industry and the medical devices industry, through their national trade associations, provided unrestricted grants to make establishment of the NHFD possible. The Department of Health, Healthcare Quality Directorate, and Arthritis and Musculo-skeletal Alliance also contributed funding to the initial development of the NHFD. After 3 years of preliminary operations, NHFD was then taken into the government's national clinical audit program, led by the Healthcare Quality Improvement Partnership [35], with funding for 3 years. The largest and most recent report from the NHFD was published in 2010 [36]. It describes 36,000 hip fracture patients presenting to our hospitals and 75% of those individuals are in the process of getting their osteoporosis cared for by the time they are discharged from hospital.

To promote best care for hip fracture patients, the Department of Health further implemented a "best practice tariff" (a financial incentive) on 1 April 2010 [37]. If the

provider hospital gets a patient to surgery in less than 36 h, if the patient is admitted under the co-care of an ortho-geriatrician, and if secondary fracture prevention and falls assessment are delivered, the provider will receive an extra GBP£445 (US \$721, € 521) per patient in reimbursement.

In 2010, an observational cohort study including data from 318 US hospitals assessed osteoporosis prescribing post-hip fracture [38]. Of almost 3,800 patients, only 7.3% received anti-resorptive or bone-forming medications. Accordingly, the UK experience for hip fracture patients could inform national reimbursement policy discussions in the USA.

Connecting FLS with national and health systems policy

Getting policy makers to understand the importance of a Fracture Liaison Service and to influence policy is no less important than the FLS itself. It is critical to develop a concise 15-second message for policy makers that is understandable in lay terms and yet communicates the economic and service implications of fracture prevention. Yesterday, Professor Harrington described the term "a single over-riding communication objective." For the UK, that short message was as follows: "There are 80,000 hip fractures a year costing £1.6 billion. Half of the cases are secondary fractures, and we can prevent up to half of the subsequent cases—about 20,000 cases a year—saving the NHS £400 million. Are you interested?" The Blue Book [8] contains some very explicit statements concerning the most pragmatic way to approach the issue of fracture prevention; the "biggest bang for the buck" is to target assessment to every fragility fracture patient. The best way we can achieve that in the context of our health service is with the Fracture Liaison Service model. Ultimately, FLS is about implementing national clinical practice guidelines. The point of the Blue Book is not to focus on the national prescribing strategy; rather, it is a response to implement those guidelines in the context of a health delivery system in a way that connects policy to programs to healthcare delivery systems.

Joint working guidance has been developed collaboratively between the Department of Health and the Association of the British Pharmaceutical Industry to define how those two groups can work together appropriately, ethically, to improve patient care. One illustration of a constructive role that the pharmaceutical industry can play in the spirit of joint working is the Fracture Liaison Service Resource Pack supported by Novartis Pharmaceuticals UK Ltd [39]. The FLS Resource Pack provides a complete picture of the policy, the rationale, the current management gap, Department of Health guidance, and the practical elements required to successfully implement an FLS. In parallel,

Amgen and GlaxoSmithKline supported the development of the Breaking Point Report [40] which provides further clarity for parliamentarians, healthcare professionals, and service commissioners on the need and means to close the secondary fracture prevention management gap. The Breaking Point was authored by a multidisciplinary editorial board with representation from the independent International Longevity Centre think-tank and several UK charities.

During Q4-2010, a series of educational events entitled “Fracture Liaison Services: Better outcomes for patients, better value for the NHS” were delivered to multidisciplinary audiences across England and Wales [41]. The UK National Osteoporosis Society led the development and organization of these events with support from an expert faculty of healthcare professionals, the Department of Health, and from the pharmaceutical sector including Amgen, Novartis, and Servier.

Lessons learned

This collaborative process of developing and implementing Fracture Liaison Services in the UK contains some important and transferable lessons for colleagues elsewhere. First, *engaging all the key stakeholders from the very outset* was a critical factor in the initiative’s success at both the local and national level. General practitioners and orthopedic surgeons had widely divergent notions of who was and should be responsible for what, leaving both a critical gap in care, and a chasm in the policy discussions. Finding common ground between all relevant professional organizations and promoting a united front in the public discourse with policy makers was crucial for developing national policy that was fit-for-purpose. Similarly, bringing patients, and their associations, into the process so they were made aware of the various pathways for fracture prevention and treatment was also crucial. The NHS is a great healthcare system; however, if patients are not appropriately engaged in their care, prevention will not occur. The effectiveness of Fracture Liaison Services rely on the FLS specialist nurse finding the patient, initiating protocol-based treatment for individuals in the inpatient setting, making treatment recommendations for outpatients to the GP, establishing evaluation parameters at 6–12 weeks, and monitoring whether the treatment recommendations have been implemented.

Second, *data matters*. While providers subscribed to the concept of the FLS, not all commissioners were quick to adopt and implement the approach. In this regard, the value of national audit data, which demonstrated disappointing improvement in the national picture by 2008 after a promising start on 2005, cannot be understated. Cost-

effectiveness analysis of FLS provides commissioners of healthcare services with a clear picture of what they, and their patients, stood to gain by the implementation of FLS. These analytical reports were crucial in our ability to convince healthcare systems to implement an FLS.

Third, *keep the policy message simple*. Decision makers have limited time and need a concise understanding of the policy, its importance, impact, and cost. The development of Blue Book 2 helped enormously in creating clarity and shaping these messages. Blue Book 2 [8] provided a platform to achieve professional consensus along with evidence-based clinical guidance and the rationale for the policy.

Conclusion

The UK experience of Fracture Liaison Services provides an illustration of how FLS can become embedded in national healthcare policy. During the first Bone and Joint Decade from 2000 to 2010 [42], the original service model developed in Glasgow, Scotland has been adopted and adapted by localities across the UK and further afield. Consensus shared by the professional organizations and patient societies led to the development of national policy that makes the case for universal implementation of FLS. Ongoing national audits provide all stakeholders with a clear indication of levels of implementation and improvement of care.

In parallel to the UK experience, effective service models have emerged across the world. What does seem to be consistent in determining the success of the FLS type model is having a dedicated case worker. This has worked in a number of countries—the UK, USA, Canada, the Netherlands, and Australia to name but a few. If consensus can be achieved and implemented globally, fragility fracture patients will enjoy the best possible outcomes and the cost borne by payers of healthcare will be reduced.

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