



Establishing a Fracture Liaison Service: AN ORTHOPAEDIC APPROACH

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An Investigation Performed at the Department of Orthopaedic Surgery, Wake Forest School of Medicine

OBJECTIVE:¹

This article presents how:

- The fracture liaison service (FLS) model provides a comprehensive, collaborative sample approach to identifying patients at risk for secondary fracture
- To perform evidence-based interventions to help prevent other fractures

BACKGROUND:¹

- Osteoporosis is a major public health threat for an estimated 54 million Americans, or approximately 50% of men and women 50 years of age and older. Therefore, bone health evaluations should be incorporated into care pathways for fragility patients who are fifty years of age or older
- A fracture liaison service (FLS) is a proven care method to achieve recommended standards of care for fragility fractures. Through this coordinated care model, patients with fragility fractures are investigated and, when appropriate, treatment is initiated to reduce risk for subsequent fractures.
- An FLS is a value-based model of care that may help improve quality of care

FLS PROGRAM IMPLEMENTATION:¹

A clear road map is critical for the implementation of an FLS to ensure that all parts share the same mission and vision for the program. The core of the FLS program is built on:

- Physician champion—some programs recommend that this be an orthopaedic surgeon
- FLS coordinator or practitioner—an advanced practice provider (e.g., nurse practitioner or physician assistant) interested in secondary fracture prevention
- Nurse navigator—responsible for identifying patients appropriate for FLS referral (reviewing inpatient censuses, emergency department discharges, and outpatient referral patterns)

Successful FLS initial implementation also requires local and community awareness for its success. This includes local and regional press releases, local news segments, webinars, and presentations at local and regional meetings. Internal awareness can be raised by hospital-wide announcements, the utilization of the FLS physician champion and coordinator at departmental meetings and conferences, and staff and nursing education by the nurse navigator to discuss the relevance of the FLS to various patient populations served by the health system. A stepwise approach to FLS network development is recommended. We also suggest starting with secondary fracture prevention for several reasons: (1) a defined patient population can be captured on the basis of billing and claims data so that compliance and program success can be tracked, (2) the population with an existing fragility fracture is at highest risk for secondary fracture, and (3) a majority of fragility fractures are managed by orthopaedic surgeons.

CONSIDERATIONS FOR FLS IMPLEMENTATION¹

Costs

- FLS coordinator and nurse navigator expenses
- Office space
- Advertising costs
- Educational materials for patients

Benefits

- Cost savings from a reduction in the number of secondary fractures
- Incremental increases in office visits if current fee-for-service model used
- Ancillary income from laboratory, radiology, and pharmacy services
- Quality measures and reporting to avoid financial penalty
- Potential referrals from other practices and hospital systems

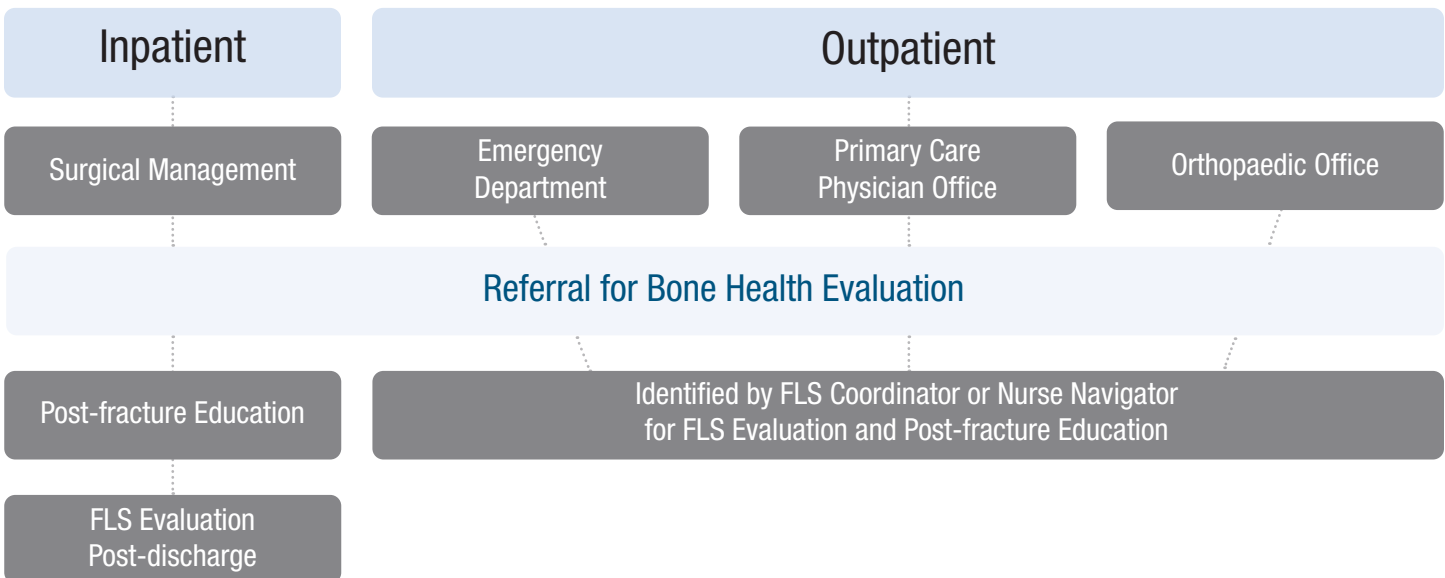
A Comprehensive, Collaborative Approach to Identify At-Risk Patients Helps Prevent Fractures

FLS PATIENT WORKFLOW:¹

Identifying all patients at risk for a secondary fracture is the primary goal of the FLS:

- The FLS coordinator or nurse navigator identifies a fragility fracture patient in the emergency department or during hospitalization
- If the patient is admitted, preliminary education is provided in the hospital
 - Education may include handouts or pamphlets, direct communication from the nurse navigator or FLS coordinator, or other educational materials such as computer-based learning or videos
- If the patient is not admitted, education is completed in the outpatient setting as follows:
 - FLS referral is confirmed and the orthopaedic provider emphasizes FLS referral and discusses the risk of a subsequent fracture at the two-week follow-up visit
- An FLS evaluation occurs between two and six weeks post-fracture and the laboratory and imaging workup is completed
- Utilization of an electronic health record is critical for accurate data reporting, which will serve to document the program's success, and the need for future growth in clinical volume

PATIENT >49 YEARS OF AGE WITH FRAGILITY FRACTURE



The FLS model is adaptable and may be adopted by any healthcare entity, such as academic health systems, integrated delivery systems, independent practice associations, accountable care organizations, large orthopaedic specialty groups, and patient-centered medical homes.¹

Establishing a Fracture Liaison Service: An Orthopaedic Approach

KEY POINTS:¹

- Bone health evaluations should be part of care pathways for fragility fractures in patients 50 years of age or older
- FLS is an established and proven method to achieve recommended standards of care for fragility fractures, including:
 - Bone health evaluation
 - Intervention for osteoporosis
 - Secondary fracture prevention
- FLS includes all patients in a health system with a fragility fracture and provides them with the interventions to help prevent avoidable fracture-related complications or readmissions
- Key personnel in an FLS include:
 - A physician champion (e.g., orthopaedic surgeon)
 - An FLS coordinator (e.g., an advanced practice provider)
 - A nurse navigator

Activate change in your organization by implementing a coordinated care, multi-disciplinary model to improve care and health outcomes for patients after a fracture

Reference: 1. Miller AN, Lake AF, Emory CL. Establishing a fracture liaison service: an orthopaedic approach. *J Bone Joint Surg Am.* 2015;97(8):675-681.



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CURRENT CONCEPTS REVIEW

Establishing a Fracture Liaison Service: An Orthopaedic Approach

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- ▶ Bone health evaluations should be incorporated into care pathways for fragility fractures in all patients who are fifty years of age or older.
- ▶ A fracture liaison service (FLS) is an established and proven method to achieve recommended standards of care for fragility fractures, including intervention for osteoporosis, secondary fracture prevention, and bone health evaluation.
- ▶ The FLS facilitates patient care by automatically including all patients with a fragility fracture within a health-care system to provide them with the intervention that they need and to prevent avoidable fracture-related complications or readmissions.
- ▶ An FLS functions with three key personnel: the FLS coordinator (usually an advanced practice provider), a physician champion (usually an orthopaedic surgeon), and a nurse navigator.

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Osteoporosis is a major public health threat for an estimated 54 million Americans, or approximately 50% of men and women fifty years of age and older¹. In the United States, “10.2 million adults have osteoporosis and another 43.4 million have low bone mass”—that is a quarter of the adult population of the country¹. Osteoporosis is the major cause of fragility fractures, defined as fractures from low-energy mechanisms that would not cause fracture in healthy bone. Annually, osteoporosis leads to almost 9 million of these fractures worldwide². As osteoporosis prevalence increases with age and our population continues to age, the number of fragility fractures will likely continue to increase as well.

Osteoporotic fragility fractures cause substantial pain and severe disability, often leading to a reduced quality of life, and hip

and vertebral fractures are associated with decreased life expectancy³. Overall, 24% of patients with a hip fracture who are fifty years or older die within one year following the fracture⁴⁻⁶. In addition to the direct effect on the patient, the economic costs of fragility fractures are substantial. In 2005, osteoporosis-related fractures were responsible for an estimated \$19 billion in costs in the United States. By 2025, experts predict that these costs will rise to approximately \$25.3 billion^{3,7}.

Once a patient has sustained a vertebral fracture, the subsequent risk of any fracture increases 200% and the risk of a subsequent hip fracture increases 300%⁸. Patients who have had any one fracture have an 86% increase in their risk for another fracture⁹. With the severity of these implications, prevention of a secondary fracture has become a primary focus from a patient

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TABLE I Costs and Benefits of Fracture Liaison Service (FLS) Implementation

FLS Costs	FLS Benefits
Salary and employee benefits for FLS coordinator and nurse navigator	Cost savings from a reduction in the number of secondary fractures
Office space	Incremental increases in office visits if current fee-for-service model used
Advertising costs	Ancillary income from laboratory, radiology, and pharmacy services
Educational materials for patients	Quality measures and reporting to avoid financial penalty
	Potential referrals from other practices and hospital systems

care and societal standpoint. Multiple programs have studied the efficacy of systems for the prevention of secondary fractures, often referred to as a fracture liaison service (FLS)¹⁰. Specifically, the FLS is a coordinated care model of multiple providers who help guide the patient through osteoporosis management after a fragility fracture to help prevent future fractures.

Programs for the Prevention of Secondary Fractures

An FLS is a special program designed to identify, investigate, and initiate appropriate treatment for patients who are at high risk for secondary fractures because of compromised bone health. A patient presenting with a fragility fracture is identified as having compromised bone quality and being at risk for future fractures. Through the FLS model of care, the patient is automatically recruited for the medically necessary evaluation of his or her risk for a secondary fracture, is given treatment recommendations, and is started on treatment as needed in order to improve bone quality and strength to reduce the risk of another sentinel event (fracture). Compared with other osteoporosis management models, such as referral letters to primary care physicians or endocrinologists following fracture, the FLS model yields higher rates of diagnosis and treatment and less attrition in the postfracture phase of care¹¹. In addition, the FLS model is based on improved care coordination and communication about these patients, leading to success at achieving the goal of secondary fracture prevention.

Prior to the implementation of programs for secondary fracture prevention, the rate of evidence-based treatment for osteoporosis after a known fragility fracture had ranged from 2% to 25% around the world¹². These numbers imply a low participation of physicians in their patients' secondary fracture prevention. In many countries, national health systems and regional centers have started to develop their own FLS-type systems, with a substantial increase in postfracture treatment implementation^{10,13-37}. In addition, with these programs attaining longevity, additional studies have shown that they resulted in not only more treatment being initiated but also an extended time of treatment adherence^{14,18-20,22,29}. Further review also demonstrated that these programs decreased secondary fracture risk and even mortality over time^{19,27,36,38-42}. Importantly, with projected increases in fragility fractures and the associated burden to the health-care systems, the FLS has also been shown to be cost-effective in multiple studies^{13,27,33,42-53}. Specifically, these cost savings are attained not only through osteoporosis management charges but also through reduced fracture rates and increased quality-adjusted life years.

The International Osteoporosis Foundation, in 2013, published a landmark paper focused on increased implementation of FLS programs for the prevention of secondary fractures around the world¹². This group created a Best Practice Framework for international implementation of FLS programs; the low participation of physicians in their patients' secondary fracture prevention was a main focus of the report.

Road Map for Implementation

A clear road map is critical for the implementation of an FLS to ensure that all parties share the same mission and vision for the program. The core of the FLS program is built on a physician champion, an FLS coordinator or practitioner, and a nurse navigator. With a core of three individuals, a successful program can be implemented and expanded as needed in the future.

We recommend that an orthopaedic surgeon serve as the physician champion as previous studies have demonstrated less success with an FLS core composed of primary care physicians, rheumatologists, or endocrinologists^{11,54-59}. There are several reasons for this: (1) the orthopaedic surgeon is already engaged with the patient and family through fracture treatment and is the one who demonstrates a link between the fracture and fracture-related disease state; (2) patients often do not return to their primary physician until after a fracture has healed, leading to the misconception that no further intervention is required; and (3) office visit time limitations of the primary care physician due to required management of other medical comorbidities may lead to a lack of prioritization of osteoporosis management and gaps in postfracture treatment^{11,54-59}.

The FLS program coordinator is typically an advanced practice provider, such as a nurse practitioner or physician assistant, who has a specific interest in secondary fracture prevention^{10,40,60,61}. This provider must have skills in multiple areas. First, he or she must have the ability to engage patients and their families in their treatment. Second, the provider needs a solid knowledge base of current osteoporosis guidelines and treatment algorithms. Finally, an FLS coordinator must have the skills to develop relationships with other specialty services within the institution for needs that extend beyond the scope of the practice, such as treatment of secondary causes of osteoporosis, therapy for gait stability and fall prevention, and nutritional needs of the patient population. This practitioner should work closely with the physician champion and is often co-located in the same office setting to facilitate patient compliance with appointments and to

provide patient-centered care. However, this practitioner should also practice independently to facilitate simultaneous care by both providers⁵⁴. The FLS coordinator may have an autonomous clinic independent of the physician champion or may independently see patients in the physician's clinic, depending on the licensing of the advanced practice practitioner. The FLS coordinator should remain current with national quality measures and guidelines and continuously update practice patterns on the basis of national recommendations⁶¹⁻⁶⁴.

Nursing support for the FLS coordinator is critical to ensure that all eligible patients are being enrolled in the FLS program, and to facilitate communication within the care team^{22,61,65-68}. We specifically recommend the use of a "nurse navigator" in this role to assist with osteoporosis education, medication administration and instruction, and prescription insurance verifications. A nurse navigator is additionally utilized to identify patients appropriate for FLS referral, including reviewing inpatient censuses, emergency department discharges, and outpatient referral patterns (Fig. 1). The navigator may be the initial point of contact for the FLS program, providing educational sessions that may include handouts or videos for inpatients, as well as facilitating outpatient referrals and scheduling with the FLS. The nurse navigator should cultivate working relationships with services outside orthopaedic surgery to ensure the capture of all patients who could benefit from the FLS. Other services could include neurosurgery, primary care, women's health, hospital medicine, and radiology, as these services can also identify and manage patients with fragility fractures that do not require orthopaedic services⁴⁰.

Capturing all patients at risk for a secondary fracture is the primary goal of the FLS, and the nurse navigator is key to this mission. Robust information technology services help to ensure all appropriate patients are identified for the FLS^{40,69}. With the use of the electronic health record, patients may be recognized as

FLS candidates on the basis of diagnostic or procedure coding. Additionally, the role of the FLS coordinator and nurse navigator as educators of other medical services is of utmost importance in improving referral patterns.

Justification of an FLS with a practice or hospital administration is achieved by comparing the cost of program implementation with the cost savings of a reduction in secondary fractures and an incremental increase in office visits and associated ancillary services (Table I)^{44,49,70}. The prevention of secondary fractures has been proven to reduce cost to the health-care system as a whole^{12,71,72}.

We suggest that start-up expenses be funded by the hospital administration as part of a quality initiative in association with a musculoskeletal service line. A business plan can demonstrate cost savings based on preventable readmissions for secondary fractures, and reportable measures such as readmission rates can justify program implementation. The program later becomes part of the departmental or service line budget to include volume projections of office visits and associated ancillary revenue directly related to the FLS service (such as bone densitometry, anabolic or antiresorptive medications, and laboratory studies). Capturing data for quality reporting is essential to demonstrate compliance with osteoporosis initiatives and to improve secondary fracture prevention.

The typical office setting includes two or three examination rooms. It is recommended that the office location parallel that of the physician champion to reinforce the care team for the disease state and improve patient access and compliance. Billing is currently separate from the global period of fracture care because of the specific expertise of the FLS in a fee-for-service model; however, transitions to value-based health systems will likely change this practice. In the future, FLS care will likely be considered the standard of care and, instead, financial penalties may be issued to institutions that fail to demonstrate compliance

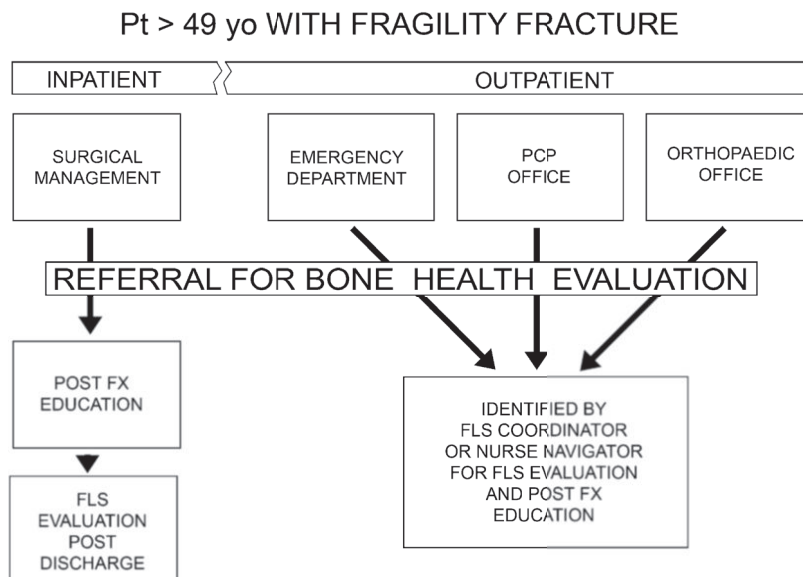


Fig. 1

Algorithm for patient referral and recruitment to a fracture liaison service (FLS). PCP = primary care practitioner, and FX = fracture.

with postfracture osteoporosis treatment. We recommend separating the FLS in the electronic health record to improve reporting capabilities of claims data and patient outcomes. Additionally, specialty-built, osteoporosis-specific templates and order sets help to capture data relating to patients' fragility fracture risk.

Laboratory and radiology facilities should ideally be available at the same location, again to increase patient access and compliance. A standardized order set for laboratory tests in the electronic health record utilizing best-practice guidelines also ensures cost-effective ordering. Imaging capabilities should include radiographs and bone densitometry. Bone densitometry is often required by insurance carriers before pharmacologic treatment can be initiated, even if the patient has a known fragility fracture with poor bone quality^{40,62}. A mobile densitometry unit should be considered for an FLS to improve utilization and consistency from one practice to another in a larger community. In addition, in accordance with the International Society for Clinical Densitometry guidelines, technicians should be specifically certified to increase accuracy⁷³.

Initial implementation of an FLS requires local and community awareness for its success. Local and regional press releases, local news segments, webinars, and presentations at local and regional meetings are ways in which the surrounding community can be alerted to a new program. Internal awareness is also critical and is accomplished by hospital-wide announcements, utilization of the physician champion and FLS coordinator at departmental meetings and conferences, and staff and nursing education by the nurse navigator to discuss the relevance of the FLS to various patient populations served by the health system. These encounters also develop a network for referrals for patients with additional needs that extend beyond the scope of fragility fracture management.

A stepwise approach to FLS network development is recommended. Networking should start with referrals within orthopaedic surgery, eventually expanding to other departments. Affiliations with other services, such as rehabilitation, pain management, women's health, rheumatology, and long-term-care facilities are necessary to ensure that patients receive a comprehensive treatment plan. External referrals help small community practices to meet national quality measures without having the volume of patients to sustain an independent FLS. Marketing and social media are also important; advertising in a selection of women's health community magazines, participation in local health fairs, or site visits to senior living centers can be cost-effective ways to introduce an FLS.

We recommend starting with secondary fracture prevention for several reasons: (1) a defined patient population can be captured on the basis of billing and claims data so that compliance and program success can be tracked, (2) the population with an existing fragility fracture is at highest risk for secondary fracture^{9,74-81}, and (3) a majority of fragility fractures are managed by orthopaedic surgeons^{62,66,82}. Establishing common goals among the physician champion, FLS coordinator, nurse navigator, referring providers, and administrative stakeholders is necessary to ensure that all participants share the same vision prior to the implementation of an FLS¹⁰.

A brand new program may have success with a focused FLS implementation for patients with low-energy hip fractures. After verifying the accuracy of the referral process and data reporting, the program can then be expanded to include all low-energy fractures in patients who are more than forty-nine years old^{66,67,83}. Data reporting is essential and should include the number of referrals made compared with the number of eligible patients, appointment no-show rate, treatment compliance, and rates of secondary fracture and mortality^{9,69,74,76-81,84,85}. This information can help inform reassessment of FLS resources and anticipate future needs of the program.

Patient Workflow

The FLS algorithm starts with the identification of a patient with a fragility fracture in the emergency department or during hospitalization by the FLS coordinator or nurse navigator (Fig. 1). We currently include all patients over forty-nine years of age who have sustained a fragility fracture in our referral population⁶⁸. A referral is placed for outpatient bone health evaluation, satisfying national quality reporting measures, and preliminary education is provided while the patient is in the hospital if the patient is admitted. Education may include handouts or pamphlets, direct communication from the nurse navigator or FLS coordinator, or other educational materials such as computer-based learning or videos. If the patient is not admitted, this education is completed in the outpatient setting as follows. At the two-week follow-up visit with the orthopaedic provider, FLS referral is confirmed and the orthopaedic provider emphasizes the importance of FLS referral, discussing the risk of a subsequent fracture^{9,69,74,76-81}. This not only alerts the patient and family to the importance of the FLS referral but also helps them to understand the consequences of avoiding intervention. FLS evaluation occurs between two and six weeks after the fracture, and the laboratory and imaging workup is completed. In the current fee-for-service model, the initial workup is usually performed in the outpatient setting; however, a changing healthcare landscape with implementation of bundled payments and value-based care around a disease state may make this distinction irrelevant.

Utilization of an electronic health record is critical for accurate data reporting^{40,69}. An electronic health record should provide robust data including the International Classification of Diseases, Ninth Revision (ICD-9) or ICD-10 code, compliance with ancillary testing such as bone densitometry, and compliance with medication. Patient lists generated by residents, advanced practice practitioners, nursing staff, or the hospital census can be used to identify FLS candidates. We created our FLS as a separate department in the electronic health record with a unique order for "Ambulatory Referral to Orthopaedic Osteoporosis Clinic" so that data specific to the FLS are more easily obtained. This also enables our providers to generate a unique patient list, thus satisfying one of the Centers for Medicare & Medicaid Services (CMS) Stage-2 Meaningful Use measures and demonstrating compliance with national quality measures⁶²⁻⁶⁴.

Documentation of program success is necessary for justification of the existing FLS and to determine the need for

future growth in clinical volume. We implemented our program with one to two clinics per week and anticipated a ramp-up period of three months. Initial clinics were run concurrently with an orthopaedic traumatologist, one of the physician champions of our program, as an active physician champion is key to the success of the FLS. The FLS coordinator then spent additional time during the week for direct communication with internal practices, education of various services in our health system, and communication with regional referral networks. At the two to three-month period, volume expanded such that we made FLS clinics available four days a week, with one day preserved for continued development of the FLS. At one year after implementation, an additional full-time-equivalent position is often required for most hospitals treating >500 fractures per year.

Current Health System Models

Medical systems emphasize value-based care, specifically weighing quality over quantity, focusing on evidence-based best practices, and measuring results and outcomes. The FLS is a value-based model of care for patients after a fragility fracture; it is adaptable to any type of health-care system, improves patient outcomes, and decreases complications and readmissions related to secondary fractures. The FLS model can be adopted in any health-care structure, including academic health systems, integrated delivery systems, independent practice associations, accountable care organizations, large orthopaedic specialty groups, and patient-centered medical homes.

Although the face of each health-care model is different, all are looking to the challenges of innovative care and continuous improvement as providers attempt to reform our health-care industry. To this point, provider performance on postfracture quality measures has been low, despite the increased emphasis on these quality measures by the National Committee for Quality Assurance and CMS⁸⁶. Reducing fragmentation in health care by improving coordination and communication is necessary to appropriately manage these patients. The FLS model provides a centralized source and tools for management with early identification of patients with a fragility fracture who, by definition, are at risk for a secondary fracture. The FLS then provides a framework for investigation and initiation of appropriate treatment. This is a model of patient-centered care with examples of coordinated care and improved communication pathways between the patient and the health-care team⁸⁶⁻⁸⁸. In the currently available health system models worldwide, the FLS can help to improve performance on quality measures and readmissions related to secondary fractures.

Adding Value Through System-Wide Performance

Similar to other prevention programs for costly chronic diseases such as diabetes, heart disease, and stroke, the FLS program can effectively be used in patient identification, timely investigation, and appropriate initiation of treatment to improve bone quality and strength in order to reduce future fractures and thus future health-care costs. The FLS model provides a platform for taking advantage of both current and predicted changes in health-care

reform⁷². Groups implementing an FLS can also access benchmarking capabilities to document both attainment of the standard of care and improved value in care^{71,72}. Current quality measures to evaluate inpatient comorbidities and complications, value-based care, and readmission rates have up to a 2% negative impact on Medicare reimbursement⁷². As health-care reform continues to evolve, potentially avoidable readmissions and hospital-acquired conditions can impart up to an 11% financial penalty by 2017. Therefore, meeting quality measures for patients with a fracture who are fifty years of age or older will be critical to avoid a financial penalty. The FLS model can help health-care organizations during this transition from volume payment to quality payment.

Current reimbursement models are fee-for-service-based and not necessarily linked to quality of care as a whole. Providers are reimbursed the same for procedures, regardless of the quality of care provided or patient outcomes. As the system moves to value-based or quality-based payments, the paradigm shifts to reimbursement based on standards of care and patient outcomes. For a health-care system to benefit from these new incentives, quality-care programs and proof of improved patient outcomes will be necessary. The FLS model of care is an example of a program that can improve outcomes in the management of patients with a fragility fracture and decrease the rates of secondary fractures. Performance is demonstrated by improved patient outcomes as well as clinical documentation in registries that satisfy the requirements of reporting initiatives.

Overview

Fragility fracture care encompasses more than an operation to stabilize a broken bone. It requires active disease management for the underlying cause of the fracture: osteoporosis. Most health-care providers fail to provide a thorough evaluation and subsequent treatment plan for this underlying disease state, and this lack of follow-through may have economic consequences in the future. The FLS model provides a comprehensive approach not only to identify patients at risk for secondary fracture but also to enact evidence-based interventions to prevent subsequent fractures. The FLS requires collaborative effort from providers, nursing staff, and administration to be successful, with the unified goal of preventing secondary fragility fractures in patients fifty years or older. Bone health evaluations should be incorporated into care pathways for fragility fractures in all patients fifty years or older, and an FLS is an established and proven method to achieve this recommended standard of care. ■

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