



NATIONAL
OSTEOPOROSIS
FOUNDATION



FRACTURE LIAISON SERVICE PATHWAY



Part I

THE BURDEN OF OSTEOPOROSIS AND THE ROLE OF A FRACTURE LIAISON SERVICE (FLS)

THE GAP IN OSTEOPOROSIS CARE

In September 2019, the NOF commissioned and released the Milliman Report on the cost to Medicare of Osteoporotic Fractures¹. The report outlined the clinical and human impact of osteoporotic fractures on the Medicare population. The following key findings from the report demonstrate the ongoing need for increased focus on post-fracture care:

- Approximately 2.3 million osteoporotic fractures were suffered by 2 million Americans covered by Medicare in 2015.
- Only 9 percent of women covered by Medicare fee for service (FFS) who suffered an osteoporotic fracture were screened for osteoporosis with a bone mineral density scan within six months following their fracture. In addition, fewer than 20% receive effective treatments post-fracture.
- Over 40 percent of Medicare FFS beneficiaries with a new osteoporotic fracture were hospitalized within a week of sustaining their fracture and nearly 20 percent died within 12 months following a new osteoporotic fracture.
- The report concludes that reducing between 5 to 20 percent of these “secondary” fractures in 2015 could have reduced Medicare FFS spending by \$310 million to \$1.2 billion over a 2 to 3-year follow-up period after a new osteoporotic fracture.

In light of this care gap, the International Osteoporosis Foundation (IOF) forged a partnership in June 2020, with several pharmaceutical companies and the University of Oxford. This partnership aims for 25% reduction in the incidence of hip and vertebral fractures due to osteoporosis by 2025². The IOF is charged with focusing on key regions to include Asia, Pacific, Latin America, the Middle East, and Europe.

The National Osteoporosis Foundation (NOF) is part of this partnership and will focus in the US region to help reach the intended goal, understanding the unique differences that exist between the US healthcare system and those of our international partners.

Capture the Fracture, an IOF initiative, is a global program that helps provide the steps to proactively implement post-fracture care programs (PFCP's) internationally. The gold standard of a post fracture care program is known as a Fracture Liaison Service (FLS). According to health economists, chronic disease management programs like a FLS are needed in hospitals and healthcare systems to reduce patient incidence of subsequent fractures due to osteoporosis, reduce future health care costs, and to improve patient experiences and outcomes^{3,4}.

In 2010, the NOF began working closely with the IOF to adopt the concept of a post fracture care program in the US. Since that time there have been great strides made toward awareness of the disease state of osteoporosis, the treatment gap that exists for patients and the need for care coordination and integration within practices and health systems for success. Despite some progress, the development and sustainability of these critical pathways in post fracture prevention in the US continue to lag.

The NOF recognizes that since 2008, there have been various post fracture care programs, pathways and models of FLS initiated with a wide range of interventions and components of each^{5,6}. For the purpose of this guide, we will focus on the Type A model of care in secondary fracture prevention as it includes identification, assessment, and treatment as part of the service^{5,6}. The NOF hopes

this guide will provide the user with the tools needed to measure both effectiveness and efficiency in the operation of a PFCP using the FLS model. Application of these guidelines will help support institutional buy-in for both development of new programs across the nation and improve success and sustainability of previously established FLS programs.

The intent of this guide is to integrate the evidenced-based, successful processes of the IOF Capture the Fracture initiative, with the similar goals of the US healthcare system, to reduce healthcare costs and to improve patient experiences and outcomes. The FLS model in post fracture care has been proven to be the single most effective way to reduce the risk of secondary fractures and reduce healthcare cost⁵. Understanding both the best practice framework of a model FLS and being able to measure the effectiveness of your FLS from both an organizational level and a patient level will assure sustainability of the process. Let's discuss the organizational component first.

FRACTURE LIAISON SERVICE DEFINITION AND PURPOSE

Common Nomenclature: FLS, PFCP, SFPP

A fracture liaison service is a champion led model of care that coordinates post fracture osteoporosis care. A FLS educates the patient and care team, investigates fracture risk and causes of osteoporosis including (but not limited to: laboratory evaluation, bone density scanning, and fall risk assessment) a FLS provider then initiates pharmacologic and nonpharmacologic treatment strategies to reduce the risk of secondary fractures. Patients in a FLS are tracked in a registry to ensure continuity of care and compliance as well as to provide data for ongoing quality tracking/improvement of the program. The plan of care is communicated to the care team including the patient's primary care provider.

COMPONENTS OF A FLS

FLS Champion: The most important component of a successful FLS is a passionate team. The FLS champion is usually the leader of the FLS team and the member who recognizes that there is a gap in care in post fracture osteoporosis and begins the process of building a program. The FLS champion is often a surgeon or provider who is crucial to developing the mission and direction of the FLS team. The FLS champion also works to ensure ongoing monitoring and quality improvement of the program.

FLS Clinician/Coordinator: Central to the success of the FLS model of care is the FLS coordinator. This role is often filled by a nurse practitioner, a physician assistant or, at times a physician. The FLS coordinator's responsibilities include:

- Identification of fragility fracture/eligible patients
- Perform clinical risk assessment and examinations
- Order bone mineral density scanning
- Order appropriate laboratory evaluation and other necessary testing
- Provide education to patient and caregivers
- Initiate and manage pharmacological and non-pharmacologic treatment
- Facilitate communication between the specialists and primary care physicians
- Follow-up with patients to monitor adherence to treatment
- Gather/manage data to measure the success of the program

Nurse Navigator: The nurse navigator can perform several roles and assists with the day to day operations of a FLS. The nurse navigator aids with identifying fracture patients and gets them scheduled for appointments. They can also educate patients and facilitate communication and coordination of care. An RN, LPN or MA may fill the role of the Nurse Navigator as needed.

Other Stakeholders: Multidisciplinary stakeholders are also involved with FLS: Administration, Quality Assurance, orthopedic surgeons, spine surgeons, neurosurgeons, radiology, pain management, emergency department, hospitalists, primary care providers, gerontologists, endocrinologists, rheumatologists, rehabilitation department, IT personnel, nutritionists, pharmacists, national organizations and societies, as well as pharmaceutical companies.

Registry: The registry is a database of information collected about patients. Data collected may be put into a formal registry or informally as part of a spreadsheet. It tracks patient demographics and pertinent information that can be used for reporting purposes.

TYPES OF FLS MODELS

There are several different FLS models. Some serve to only educate the patient, while others only notify the patient’s primary care provider of the fracture and defer workup and treatment. A study published in 2013, evaluated the effectiveness of different types of FLS programs⁶. The most effective FLS programs were those that are considered “full service”, or those that identified osteoporosis as the underlying cause of the fracture, investigated further by completing a thorough workup, and initiated treatment. These “full service” FLS programs have demonstrated an increase in the percentage of post-fracture patients who had bone density testing from 13%, with current standard of care, to 79% and increased the percent of patients initiated on treatment from 8%, with usual care, to 46%.

MODEL OF PROGRAM	DESCRIPTION	PERCENTAGE OF FRACTURE PATIENTS THAT UNDERWENT BMD TESTING	PERCENTAGE OF FRACTURE PATIENTS SUCCESSFULLY IMPLEMENTED ON PHARMACOLOGIC TREATMENT
Current Standard of Care		13%	
Type D	Patient is educated only, PCP not alerted		8%
Type C	Patient is educated about underlying osteoporosis, PCP is alerted	43%	23%
Type B	Osteoporosis identified and assessed (but treatment not initiated)	60%	41%
Type A	Osteoporosis identified, assessed, and treatment initiated by FLS service	79%	46%

SUCCESS OF FLS PROGRAMS IN THE UNITED STATES

The impact of successful FLS programs has been demonstrated across the country. Kaiser Permanente developed the Healthy Bones program in 1998, and in 10 years, following the initiation of that program, the hip fracture rate was reduced within the Kaiser Permanente system by 40%⁷. Based on expected national incidence of fractures, it was estimated that if a similar program was implemented nationally, annual hip fractures could be reduced by 100,000, and \$5 billion could be saved per year⁷. Geisinger Health System also implemented a post fracture osteoporosis program, HIROC, and achieved \$7.8 million cost savings from 1996, to 2008⁸.

Wake Forest Baptist Medical Center published data in May 2020⁹, demonstrating the success of their FLS program to deliver high levels of treatment implementation and adherence. Of the fracture patients who were successfully identified and had an appointment with the FLS provider, 76.96% of patients were initiated on treatment. Of those, 81.64% of patients remained adherent to treatment and only 1.05% of patients on treatment sustained a secondary fracture.

Iowa Ortho initiated a Bone Health Clinic¹⁰ and FLS in 2015. Preoperative bone health assessment (before elective orthopedic procedures) is a component of their bone health clinic. Since the initiation of their program, osteoporosis treatment rates have been improved, intraoperative/postoperative fracture rates have been reduced and the practices' financial performance has benefited from the FLS¹⁰.



Part II

DEVELOP A BUSINESS PLAN FOR FLS

ESTABLISH MISSION AND VISION

Develop a clear, simple mission statement for your FLS. For example: “To enhance the care of patients following a low trauma fracture and close care gap for a population at risk for subsequent fractures through a fracture liaison service coordinated model of care.” Think about the vision and how the program can be expanded over time.

For a FLS program to be successfully planned and implemented, the first necessary step is to have a passionate champion. The champion is the lead person who likely already understands the gap in osteoporosis care and is poised to develop a program to decrease the gap in care. They will be largely leading the development of the financial and business plan as well as getting support and approval from administration.

GOAL DEVELOPMENT

- Perform a Baseline Audit (if possible). While this is not absolutely required prior to implementation, it can be very helpful if baseline data is obtained. A baseline audit defines the extent of the care gap before service implementation by providing the number of fractures seen within the system. Improvements in closing the gap will be measured against this baseline data & justify the benefits of your program.
 - Sources of baseline data include EHR and unified billing system.
 - Query system for all low trauma fractures in women and men ≥ 49 years of age
 - Exclude trauma codes, finger, toes, and skull fractures
 - Identify location of care
 - Obtain information on DXA scans, lab tests, evaluation for secondary causes, calcium and vitamin D, and prescription medications if possible
 - If data is not available or obtainable, note reasons why
- What will the goals be?
 - Goals will depend on the scale of the program. They should be simple and achievable
 - Identify, investigate, and treat where appropriate, a specified percentage of women and men >49 years of age and older with low trauma fractures
 - Goals should focus on the key performance indicators listed in part III of this guide.
 - Goals may be subdivided into more manageable components. Examples:
 - Identify, investigate, and treat patients with hip fractures
 - Identify, investigate, and treat hospitalized patients and those who present to the ED
 - Identify and extend services to all inpatient and outpatient fracture patients
- How will success of FLS be measured and tracked?
 - Post FLS implementation data tracked in registry compared to baseline data.

CREATE A FUNDING PLAN

Expenses and projected income should be considered to determine the financial sustainability of a FLS. Expenses may vary based on site.

- Expenses to include in plan
 - One-time expenses may include acquisition/installation of FLS registry and EHR, DXA training and FLS training and certification
 - Recurring expenses may include personnel, malpractice insurance, administrative support, and DXA technician
 - Operating expenses may include database and IT costs, production of reports/questionnaires, support literature, DXA lease, DXA office equipment and supplies, office rent, phones, utilities etc.
 - At most FLS sites, existing equipment and personnel may be available, so there may be no increased expenses in many cases. For example, if a hospital or larger health system is implementing a FLS, they may likely have an existing DXA machine, tech, lab, and clinic space. These are considered “sunk costs” and can significantly reduce the cost of implementing FLS.
- Determine Projected Revenue
 - Estimate number of new fracture patients per year (use your audit to project)
 - Evaluate insurance coverage and investigate average reimbursement for Medicare vs Commercial insurance
 - Determine level of care for initial visits and follow ups to calculate potential revenue (Clinics can code and bill for patients seen within the global period using appropriate modifiers)
 - There will likely be other indirect sources of income, often described as downstream revenue. Possible sources include injectable in-office treatments, IV infusions, x-rays, DXA, labs, PT etc.
 - Reimbursement of a first fracture is the same as reimbursement of preventable secondary fractures, although cost of secondary fractures is more expensive, resulting in less revenue with subsequent fractures.

Progressive implementation of a FLS can decrease the startup costs for a FLS. This may include utilizing an existing clinician who can begin running a dedicated FLS “part time”, a few days a week. As referrals increase, the amount of time the clinician dedicates to the FLS will scale up, eventually becoming a full-time position. Additional staff, such as the FLS Nurse Navigator, could then be added after patient load and revenue allows. In this way, revenue is not lost while waiting for the FLS program to grow.

GAIN C-SUITE AND/OR ADMINISTRATION SUPPORT

Gaining C-suite approval is usually led by the FLS champion. Having baseline data to show a gap in care within the organization can be very helpful in advancing the case for a FLS program. Make the case. Also, using data to show the burden of osteoporosis and fractures can be convincing. Consider giving a presentation to demonstrate this data and have a proposed business plan ready to provide a solution for the gap in care. Find an administrative champion who supports the idea of a FLS (may be CEO, CMO, quality department, patient safety, etc.).

Part III

OPERATIONS OF A FLS: BEST PRACTICE FRAMEWORK (BPF) AND KEY PERFORMANCE INDICATORS (KPIs)

A. MEASURING THE EFFECTIVENESS OF YOUR FLS FROM AN ORGANIZATIONAL LEVEL (BPF): *Best Practice Framework for FLS = The 5 I's*

By now, the mission and vision of your FLS should be clear and you should have a strong business plan with administrative support. The key components of Best Practice Framework (BPF) in FLS is **critical to the sustainability** of your program from an organizational level. The triple aim of a FLS for any healthcare system or practice is to be effective, efficient and deliver the best patient experience. Most important, these aims must be measurable whether in process or in performance. Adhering to a BPF assures your organization is in the right position and has the right ingredients for success. The key components of a FLS begins with the 5 I's; identification, investigation, inform, intervene, and integrate^{3,11,12, 13}.

1. IDENTIFICATION

An effective FLS will need to **identify** 2 types of fragility fracture patients: those 49 and older with **non-vertebral fractures** and those 49 and older with **vertebral fractures**. The 5I's will be the same for both pathways but there must be a clear distinction between the two. There are specific differences in identification opportunities and process for each of these patient types and the key performance indicators for each, which we will discuss shortly.

Nonvertebral fragility fracture: The care coordination pathway is fairly standardized across health systems for the non-vertebral fracture patient. For this reason, identification of this patient is more straightforward. Their fracture treatment is managed by a team, including ER providers, admissions, inpatient hospitalists and orthopaedists. A post fracture care pathway like a geriatric hip fracture program that expedites care and assists in risk mitigation for the high-risk patient, may already be in place¹⁴. A FLS is easily adaptable in this type of system and makes patient identification easier. With proper communication and care coordination, these patients can be placed in the FLS pathway for secondary fracture prevention.

Vertebral fragility fracture: Unlike the non-vertebral fracture patient, Identification is more challenging with vertebral fracture patients since there is a wide array of clinicians that may be involved in their overall care. The fracture may initially be diagnosed by an ER team or physician, but treatment of the fracture is typically referred out to other specialists that could include orthopaedics, neurosurgery, interventional radiology, pain, or anesthesiology. This makes it difficult to “capture the fracture” for the FLS thus requiring a unique pathway. Initially patients are identified by clinical presentation (back pain), reported data (by DXA or VFA), or opportunistic (radiological findings from other testing), so it is important to communicate and clarify how this patient group will be identified depending on how and where they may present for their fracture care. Care coordination between providers is critical to the success of this pathway, as well as program marketing and awareness within a system.

2. INVESTIGATION (ASSESSMENT)

Once a nonvertebral or vertebral fracture patient has been identified and placed in the FLS pathway, an appointment with the FLS provider should be scheduled in 2-6 weeks if possible. Given the teachable moment and the need for treatment initiation to reduce the risk for another fracture, the sooner a patient can be seen, and a workup completed to better the patient experience. Ideally, a patient should be seen within 2-6 weeks but no later than 12 weeks after the fracture. This allows for optimal patient experience and improved outcomes following a fracture.

The work up will include relevant lab testing for secondary causes, falls risk assessment and a bone density test if appropriate¹³. Providers should keep in mind that a bone density test is not required to make the diagnosis of osteoporosis in the presence of a fragility fracture or in some cases is not required before initiating treatment. However, a bone density will be needed at some point and the goal should be to obtain a bone density if needed in less than 12 weeks from the original fracture diagnosis¹¹.

3. INFORM

An important role of the FLS is providing patient education that meets a patient's healthcare needs. The patient should be provided information on Osteoporosis, risk for future fractures, and lifestyle modifications for improved bone health. Lifestyle modifications may include guidelines on nutrition, exercise and fall prevention. The FLS provider should discuss the importance of medication treatment and adherence in order to reduce the patient's risk for future fractures and must include the benefits and side effects of these treatments^{3,13}.

Patients and their caregivers should be given information about additional resources on Osteoporosis. Communication from the FLS to the patient, caregivers and other providers involved in this patient's care is a key component in this care coordinated model. HCP's play a significant role in monitoring compliance with treatment since they may see the patient more frequently than the FLS provider¹¹.

4. INTERVENE (TREATMENT)

Intervention to reduce the risk for future fractures should be offered to these high-risk patients, following a low trauma fracture. This usually occurs within 2-4 weeks after the work up is completed but should not exceed 16 weeks from the fracture diagnosis. Patients should be offered falls prevention education and further PT/OT evaluations if appropriate to maximize balance and mobility. Follow up with the patient once treatment measures have been initiated should occur within 3 to 4 months for the initial follow up and then 9 months later to ensure treatment adherence and that medication is being taken appropriately. Follow-up appointments are also a great time to make a referral for falls reduction programs if fall risk remains high¹¹.

4. INTEGRATE

Once the FLS pathway is established, the sustainability of your program will depend on how your FLS integrates within the larger health system. Integration actually starts at the point a patient is identified and fracture care begins. Integration helps to facilitate an inclusive pathway ensuring that all appropriate patients are identified through effective case finding and well-established referral process. The FLS team must provide clear management plans for the long-term management of the osteoporosis, maintain relationships with relevant in-hospital services, and participate in multidisciplinary grand rounds or meetings to assure referral pathways between the FLS and other relevant services are well understood¹¹.

The BPF/5I's recommendations are not meant to place limitations on your program development but to simply provide the framework for strategic planning and future growth. As your program succeeds in integrating within your system and executes the Best Practice Framework, you will find greater opportunities for growth of your program. For example, your FLS may expand to include the identification of traumatic fractures since current research shows that patients with traumatic fractures may also be at risk for future fractures⁴ and may benefit from a bone health

workup as well as for improved outcomes. In addition, growth of your program can open the door for referrals from other providers who have identified patients at high risk for future fractures who will benefit from a bone health evaluation who may not yet have sustained a fragility fracture.

B. MEASURING THE EFFECTIVENESS OF YOUR FLS FROM THE PATIENT LEVEL (KPI'S): *Key Performance Indicators (KPI's) that are meaningful and measurable*

The purpose of this section is to address key performance indicators that will measure the current performance for an FLS. The goal is not to readdress Centers for Medicare and Medicaid Services (CMS) and/or other weaker measures on osteoporosis that many of you may already be reporting on from your organization. This section will address how to prioritize what to improve on and understand how to improve¹².

KPI's are used to measure the quality of your FLS program from a patient perspective. Each KPI will be synergistic with your BPF so it is essential to have your BPF firmly established in order to effectively meet the KPI's.

If your FLS can meet the KPI's as outlined below, your system will automatically meet the current identified US government measures and demonstrate the value of your FLS in both quality and in narrowing the fragility fracture treatment gap. By meeting these KPI's your system will have an even greater impact on this vulnerable patient population. These KPI's will assist us in recommending that CMS recognize the need for stronger measures that are more precise and better measure how we have improved the patient experience and their outcomes while reducing risk for future fractures as well as reducing healthcare costs.

Note: Although we are using Key Performance Indicators (KPI's) from the Capture the Fracture initiative, the time frame for initial appointments and follow-up appointments may vary for your FLS. Many US based FLS programs have tried to tighten some of those measures to ensure fracture patients are captured sooner, in the teachable moment and for access to care¹³. We recommend using the KPI's as minimal guidelines leaving room for improvement and growth.

KPI 1: NON SPINE FRACTURES IDENTIFIED TO FLS/EXPECTED CASELOAD FOR ALL FRACTURES EXCLUDING SPINE (SHOULD BE 5 TIMES THE NUMBER OF HIP FRACTURES)

How well does your FLS capture/identify all fragility fractures (non-vertebral)? In order to establish a baseline for future performance of patient identification, an internal audit prior to program initiation is important. This may come in the form of a local audit, population data set or simply looking at the number of admissions of non-vertebral fractures^{12,13}. You can calculate this with a simple fraction. Take non spinal fractures identified as your numerator over expected case load for your FLS. According to Health Care Economist, using hip fractures will be helpful in calculating your expected case load^{12,15}. If you audit the number of hip fractures seen in your system and multiply by 5 then that will provide you with an appropriate expected caseload for your FLS nonvertebral fractures.

Fraction Equation: Non-vertebral fractures / x5 the number of hip fractures should show you expected caseload for your system wide FLS

KPI 2: NUMBER OF INDEX SPINE FRACTURES IDENTIFIED/TAKE 75% OF THE NUMBER OF HIP FRACTURE ADMISSIONS (SHOULD BE $\frac{3}{4}$ OF HIP FRACTURE CASES OR 75%)

How well does your FLS capture/identify vertebral fracture patients? For your vertebral fracture measure, you will use a similar audit and fraction calculation. The only difference will be that your numerator will only contain spine fractures and your denominator will be 75% of the total number of hip fractures. That should be your expected case load for vertebral fracture captures.

Fraction Equation: Number of index spine fractures/75% of hip fracture admissions

KPI 3: FRACTURE DIAGNOSIS TO ASSESSMENT LESS THAN 12 WEEKS

How timely are patients getting to the FLS service? Consider 12 weeks as a minimum timeframe to complete a patient assessment, however targeting the assessment for a 2-6-week timeframe would be optimal in that you would capture the patient within the teachable moment.

Fraction Equation: Fracture Diagnosis less than 12 weeks/All FLS patients

KPI 4: FRACTURE DIAGNOSIS TO BONE DENSITY LESS THAN 12 WEEKS

How timely are patients getting a bone density after the fracture? Begin by considering 12 weeks as a guideline but remember that every patient does not need a DXA to start therapy after a fragility fracture? At some point, a baseline bone density will need to be completed, however, it may be done anytime from the time of fracture and up to 12 weeks but treatment initiation should not be delayed by the bone density test in the presence of a fragility fracture. The new baseline bone density will need to be completed for the purpose of monitoring treatment response, not to diagnose osteoporosis.

Fraction Equation: Fracture Diagnosis to Bone Density testing should be less than 12 weeks/ FLS patients

KPI 5: FALLS ASSESSMENT

Was Fall Risk assessed on all patients? Consider current fall risk assessments, identify, and document potential risk for falls. Document fall prevention education or intervention provided? Familiarize yourself with national recommendations and document appropriately.

Fraction Equation: Falls Assessment/All FLS patients

KPI 6: RECOMMENDED ANTI-OSTEOPOROSIS MEDICATION (AOM)

How many patients were recommended AOM? Calcium and Vitamin D therapy is important for bone health, but they are not indicated to reduce the risk for future fractures making the initiation of appropriate osteoporosis medications is critical important after a fragility fracture to prevent secondary fractures.

Fraction Equation: Recommended Anti-osteoporosis Medication/All FLS patients

KPI 7: DOCUMENTED FOLLOW UP WITHIN 16 WEEKS OF A FRACTURE FOR TREATMENT MONITORING

How quickly are patients scheduled for follow up after starting treatment? A follow up visit to monitor treatment adherence/compliance at 3-4 months is important given the research that shows low adherence to treatment after 6 months and due to the high risk for a secondary fracture.

Fracture Equation: Documentation of treatment monitoring within 16 weeks of fracture/All FLS patients

KPI 8: STRENGTH/BALANCE PROGRAM STARTED BY 16 WEEKS POST FRACTURE

Was the patient on a strength/core strengthening/balance program for falls prevention? For patients who remain at high risk for falls and continue to have balance issues, a formal program for strength and balance should be recommended to reduce risk for falls. Many fracture patients may still be in physical therapy but need extended evidence-based exercises for balance and strengthening. The decision will be up to the FLS provider based on the fall risk and progress of the patient. Patient exclusions based on type of fracture, age or other limitations may be made.

Fracture Equation: Strength/Balance started by 16 weeks post fracture/All FLS patients recommended anti-osteoporosis medications (AOM)

KPI 9: ANTI-OSTEOPOROSIS MEDICATIONS STARTED BY 16 WEEKS POST FRACTURE

In reviewing current US FLS models of care this 16-week timeline is very conservative, however, it should be considered the maximum time frame to treatment since the imminent fracture risk is high. The time it takes for certain medications to reduce the risk for future fracture should be considered making the need to start treatment sooner than later critical. Ideally, patients should be started on treatment within 4-8 weeks and sooner if possible. This allows enough time for the patient to consider treatment options, obtain any prior authorizations and confirm need for any additional work up¹³. If a particular patient cannot be seen prior to the 16-week maximum time frame it is recommended that there is documentation as to the reason for the delay (patient reluctance, additional work up needed, cost of treatment, etc.).

Fraction Equation: Anti-osteoporosis medications started by 16 weeks post fracture/All patients recommended anti-osteoporosis medications

KPI 10: FOLLOW UP ON AOM TREATMENT MONITORING 52 WEEKS POST FRACTURE

Does the patient have a 1 year follow up since starting osteoporosis treatment? If, at the 3-4 month follow up, the patient is doing well, has started and is compliant with treatment and the FLS provider doesn't have concerns then a one year follow up should be scheduled to measure adherence, including patient progress, compliance and for a clinical review. Depending on the AOM selected, patients may be seen more frequently. Regardless, patients should be seen by the clinician at the 12-month time frame.

Fraction Equation: Anti-osteoporosis medication follow up at 52 weeks/All FLS patients recommended AOM therapy

KPI 11: NUMBER OF KPI'S WITH >80% COMPLETE DATA

How many of your FLS KPI measures were at >80%? Achieving 100% is difficult, we must consider what is realistically acceptable to show improvement^{11,12,15}. Healthcare economic models on quality, have shown that achieving 80% delivers cost effectiveness and cost saving¹². Many FLS programs are challenged with benchmarking their progress for continued institutional support. Good quality data makes providing that information easily accessible and helps to justify the value of continuing the program. Performing an audit annually will help ensure that your FLS is delivering on their expectations

Fraction Equation: Number of KPI's with >80% complete data/10 KPI

UNDERSTANDING DATA REGISTRIES AND POST FRACTURE CARE

A clinical data registry is an interactive database that collects, organizes, and displays healthcare information. There are several types of clinical registries such as patient registries (disease state), medical specialty registries, population registries (population health), medical device registries and payor registries. The purpose of any of these registries are for quality improvement, benchmarking, clinical research, clinical effectiveness, and cost effectiveness. Moore describes registries as “living evolving valuable resources that drive meaningful, measurable quality improvement¹⁶”.

At this time, no such registry exists specifically related to the post fracture care pathway and the FLS model that includes all the key performance indicators. In 2008, the AOA developed a program known as Own the Bone. The intent of this cloud-based program was for hospitals to have a tool to improve the prevention of secondary fractures and as a way to monitor physician compliance. It strongly encouraged orthopedic teams to be the first line of defense in closing the fragility treatment gap. The primary outcome measures focused on patient counseling on Calcium and Vitamin D supplementation, weight bearing exercise, smoking cessation, fall prevention, bone density testing and pharmaceutical intervention. Secondary outcome measures focused on improved information flow and communication between the orthopaedic provider and primary care¹⁷. This platform has performed well in certain health systems but barriers remain toward its utilization to include cost, the need for staff for data entry and its ability to push the FLS process toward a Type A (full service) Model, which are known to be the most successful and sustainable FLS model¹⁴.

The ultimate goal is to have a national patient registry, much like those used for other chronic disease management programs, that focuses on osteoporosis and the post fracture care pathway. This registry would include all measures and informational workflow that leads to stronger FLS models. There is a program registry that may provide the “complete package” but will need to be piloted and adjusted based on pilot findings. This program registry looks promising in that it will assure meeting the 5 I's and provide software for strong integration within EHR systems. Similar barriers to its utilization will include ease of use and cost. Grant funding would provide support to health systems and help incentivize FLS and registry adaptation.

WORKFLOW IN YOUR FLS/PFCP PROGRAM

You have now transitioned from concept to near implementation. Now is the time to find where your patients come from, and ultimately where they can be found, engaged, educated, treated, and retained.

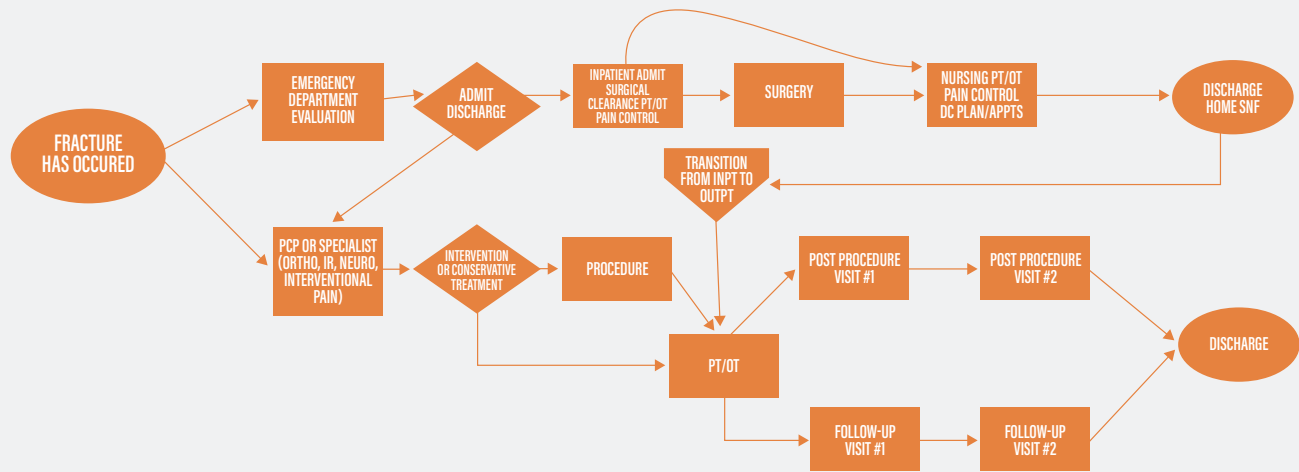
Workflow is not exciting; however, diagramming workflow provides a reference tool to successfully integrate patient flow into your practice. It is also a powerful tool for continuous improvement of your program.

Identify the patients that best meet the initial program goals. Do not attempt to get every fracture patient into your service initially. Start with one fracture type and follow the workflow. Make sure to talk to all the shareholders in the workflow to find areas that the FLS/PFCP fits appropriately and answer questions such as:

- What do I need to do to identify the patients?
- Do I have the needed computer access?
- Can this be automated in an EHR system in my facility/practice?
- How can I engage with the patient?
- How can I educate providers about the need to address the fragility fracture treatment gap?
- How can I educate appropriately identified patients that they should come to my program?
- How do patients get referred and scheduled? Who does this in my organization?
- Once scheduled, do I have capacity to see the number of patients generated?
- At what point can I order labs?
 - If this is an inpatient referral, can I get inpatient labs?
 - If not, can I get labs prior to seeing the patient?
- Where/when can I get a bone density?
 - Can a scan be ordered for a patient prior to being seen?
 - Do I need this prior to starting treatment?
 - Do I need this for insurance authorization?
 - Do I need this to further convince the patient?
 - Where will I get a bone density test from?
 - What is the wait time to get the test done?
 - What is the quality of the study going to be?
- At what point can I initiate a patient on treatment?
- If you will be managing your patient's osteoporosis long term, how do I keep those patients engaged in my process?

Most patients who suffer hip and non-vertebral fractures go through the orthopedic workflow. Vertebral fracture patients can come from a variety of sources or workflows, (see Part III, #1).

The workflow example here shows hospital-based workflow on the top row, outpatient workflow on the bottom for standard fracture management. This is only an example, use this template to build your specific workflow. Add departments and service lines to make this a reproducible, customized tool for your service/institution/practice. Diagram the proposed workflow of your FLS/PFC program to see where it integrates with inpatient/outpatient workflow.



ADVANCED FLS

This section will address potential opportunities for your FLS in the future. Each service is unique, so some of these processes may work, some may not.

A FLS program is dynamic. It changes as it develops and is constantly improving. Process improvement is a hallmark of all FLS programs that have demonstrated long term success. Successful FLS teams revisit their workflow diagrams regularly to make improvements in patient flow, education, retention and more. Sustainable FLS programs reevaluate their original goals to affirm they have been met and adjust goals as needed. For example, as patient volumes increase, additional staff may be needed to manage the added number of patient encounters, handle prior authorizations, communicate with specialty pharmacies as well as direct patient care.

Many FLS/PFCP programs eventually expand, taking on additional referrals for primary prevention. The workup for this patient is identical to that done with the post fracture patient; however, the challenge becomes educating the patient about a disease process that has few noticeable symptoms. The FLS may also receive referrals of younger patients with fractures. Advancing an FLS to include these populations will come with time and increase the value and significance of the FLS to your organization. The identification and resolution of secondary causes of osteoporosis can lead to improved healing rates of both traumatic and atraumatic fractures.

Another patient population that may benefit from a thorough bone health evaluation by a FLS provider are those who have osteoporosis and face elective or other surgeries/procedures. Orthopedists and neurosurgeons, among other specialists, have incorporated risk mitigation strategies for their “at risk” patients by having their bone health evaluated prior to surgery. Patients

who have compromised bone should be optimized prior to any elective, bone related surgery (think spinal fusions and joint replacements). This not only improves outcomes but has the potential to reduce the risk of post-operative fracture or non-union.

There will be other reasons that patients seek the services of a FLS, all of which will lead to additional patient volume. Each encounter provides an astute provider the opportunity to further educate patients and their families on osteoporosis and bone health.

As your FLS grows, continued communication and engagement with stakeholders and your champion regarding your programs challenges and achievements will remain a critical element to demonstrating success and value of the clinic.

We leave you with this: Change is constant, successful programs embrace the change on the journey to improved patient care and long-term outcomes.

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