

# Osteoporosis management in the United States

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## Abstract

There are numerous organizational osteoporosis initiatives in the United States offering a variety of recommendations and guidelines. A common method of implementing these goals is centered around multidisciplinary provider teams with the broad task of diagnosis, treatment, and prevention of current and future osteoporosis related fractures. These teams have generally proved to be successful even though it remains debated, which specific provider specialty is ultimately responsible for osteoporosis care. The current United States healthcare infrastructure represents the significant obstacle in widespread adoption of successful treatment programs. The development of further quality standards and incorporation of fracture liaison services into reimbursement and funding models will allow for continued improvement in osteoporosis care.

**Keywords:** fracture prevention, fragility, osteoporosis management

## 1. Introduction

Osteoporosis is a chronic disease characterized by a decrease in bone mass and disruption of microarchitecture, predisposing to low energy fragility fractures. These fractures are not only associated with limited mobility and chronic disability to the patient, but also represent a substantial burden to the healthcare system. An estimated 53 million Americans either carry a diagnosis of osteoporosis or are at risk for fracture due to decreased bone mass.<sup>[1]</sup>

## 2. National guidelines and standards

While there are many United States (US) initiatives and published guidelines regarding bone health and osteoporosis management, there is no central or unified group that serves as the gold standard of management recommendations. The current organizational recommendations are not always completely aligned and often are redundant in their efforts and position statements. Despite this, there have been successful elements arising from many of these individual efforts. The National Osteoporosis Foundation (NOF) has published recommendations to explicitly define and expand the diagnostic criteria for osteoporosis.<sup>[2]</sup> In addition to the

more widely adopted criteria derived from bone mineral density (BMD) testing, these recommendations outline fracture patterns that may independently allow the clinical diagnosis of osteoporosis and the role of the World Health Organization Fracture Risk Algorithm in diagnosis. The NOF has also put forth a series of clinician guidelines with detailed recommendations regarding specific indications for diagnostic assessment tools, pharmacological treatment, and monitoring protocols.<sup>[3]</sup> These guidelines also outline appropriate use of BMD testing and diagnostic vertebral imaging, as well as indications for the use of biochemical markers and alternative bone densitometry tools to guide treatment. The American Association of Clinical Endocrinologists and the American College of Endocrinology together have established a series of comprehensive graded guidelines for osteoporosis management as well as the prevention of osteoporotic fractures, based upon review of most recent relevant literature. The most recent update focuses on identifying and appropriately stratifying higher risk patients and guides the resulting treatment recommendations.<sup>[4]</sup> Other organizations, such as the American Academy of Orthopaedic Surgeons, American Orthopaedic Association, US Preventative Service Task Force, American College of Radiology, American College of Physicians, American College of Preventative Medicine, Endocrine Society, American College of Obstetricians and Gynecologists, American Academy of Family Physicians, and North American Menopause Society have offered similar recommendations and position statements.<sup>[5–14]</sup>

The American Society for Bone and Mineral Research, which promotes the coordination of clinical and scientific study of bone health and metabolism, offers task force reports on various osteoporosis related topics, but have not published guidelines, but rather supported the guidelines of the NOF. Regarding interventions and secondary fracture prevention, the American Society for Bone and Mineral Research identified and summarized key elements from the many current US and international initiatives that have proven successful and advocated for their combined adoption to streamline and advance progress in osteoporosis care.<sup>[15]</sup> The task force emphasizes implementation of coordinator-based systems which utilize a dedicated provider, often a nurse or nurse practitioner (but can be a physician or physician assistant (PA)), to direct a patient's care.

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### 3. Organization, successes, and barriers

#### 3.1. Models of care

A fragility fracture is often the “sentinel event” triggering the work-up for osteoporosis as a decrease in bone density is a gradual and otherwise asymptomatic process. Not surprisingly, the fragility fracture provides the opportunity for patient capture and intervention for both the fracture and underlying bone disease by the orthopedist and staff. Unfortunately, the appropriate subsequent evaluation and management does not occur in a vast majority of these patients. In a study of Medicare enrolled patients, only 30% received osteoporosis treatment in the 6 months following a fragility fracture.<sup>[16]</sup> This rate falls to 23% in hip fracture patients. National Healthcare Effectiveness Data and Information Set (HEDIS) quality data correlates similarly, with a treatment rate of 18% to 22.8% over the same time period.<sup>[17]</sup> This is thought to occur due to ambiguity regarding ownership of bone health care following fracture care, as some feel this should be an extension of the orthopedic care while others believe it is more appropriately handled by primary care providers or bone health specialists.<sup>[18,19]</sup> The typically finite nature of outpatient orthopedic follow-up following fracture care is often cited as ill-suited to include management of a chronic condition like osteoporosis, while coordinating transitions of care outside of the acute setting is often derailed by a lack of established standards. The most successful response to this has been the development and implementation of coordinator-based models designed to manage bone health.

Fracture Liaison Service (FLS) models were developed in the late 1990's and function to aid in the appropriate evaluation and treatment of patients with a clinical diagnosis of osteoporosis.<sup>[20,21]</sup> Implementation of an FLS program, typically comprised of an interdisciplinary team of orthopedic surgeons, primary care physicians, and physician extenders, not only serves to provide initial care to patients with and at risk for fragility fractures but also to function in secondary fracture prevention and oversee long term medical treatment. Additional contributions from dietitians and physical therapists are critical to patient care and management in the FLS model. A dedicated FLS coordinator (often a nurse or nurse practitioner) will oversee the process of bone health education as well as take part in initial evaluation and long-term management. Most importantly, the coordinator can shepherd the transition from the acute or hospital setting to long term outpatient osteoporosis management.

The Own the Bone program is an example of an FLS model developed by the American Orthopaedic Association in 2009.<sup>[22,23]</sup> The program provides a systems-based protocol designed to accomplish a set of basic measures of orthopedic care in patients with fragility fractures and provide support to help healthcare systems put in place a bone health program. The measures include nutritional counseling, physical activity and lifestyle recommendations, diagnostic testing, pharmacologic interventions, and communication with the patient and primary care providers regarding osteoporosis care. The Healthy Bones Program, instituted by Kaiser Permanente Southern California, an integrated managed care organization, utilizes a similar model.<sup>[24]</sup> Started in 2001, “care managers” serve as the central liaisons within a ten-step process to identify at risk patients within the organization and provide necessary interventions to manage their bone health. The Geisinger Health System, an integrated regional healthcare system based in Pennsylvania, USA, developed their own system based FLS care model by first establishing an outpatient care pathway with high-risk osteopo-

rosis clinics (HiROC).<sup>[25]</sup> Once these were implemented, an inpatient FLS model was then created and integrated within the HiROC program. Finally, the International Geriatric Fracture Society provides supporting framework for hospitals and physicians to build and operate FLS programs, as well as providing accreditation for achieving quality benchmarks.<sup>[26]</sup>

#### 3.2. Funding

The total annual cost for osteoporotic fractures within the Medicare population was near 57 billion in 2018.<sup>[1]</sup> The allowed financial cost associated with a new fragility fracture in beneficiaries covered by both Part A and B was approximately \$21,600 in 2016.<sup>[1]</sup> The incremental cost of subsequent fractures within 3 years compared to new fractures was \$20,400. Finally, the total cost across 257,000 beneficiaries who sustained secondary fractures accounted for \$5.7 billion to Medicare. Yet, there is little national funding for osteoporosis care initiatives in the US. While most of the US health care systems rely on private insurance payers, hip fracture care is largely covered by the primary public healthcare system, Medicare, given the age of the patients. Funding for osteoporotic diagnostic tools such as BMD testing are covered via Medicare benefits, but a decline in reimbursement (70% reduction in 2015) has resulted in a drop in utilization.<sup>[1]</sup> The US bundled payment model of reimbursement tends to disincentivize additional long term osteoporosis care as this continues outside of the 90-global period associated with the fragility fracture and is deemed to be “extra,” not directly related to the sentinel fracture event. Support for osteoporotic medications via insurance is often difficult to get approved and even if approved can be cost prohibitive resulting in poor compliance with the medications.

#### 3.3. Outcomes

FLS programs have proven to be effective in many domains of osteoporotic care, including the reduction of secondary fragility fractures and significant cost savings. Also, in comparison to models based on patient education, FLS programs lead to increased rates of osteoporosis investigation (some form of bone densitometry), medication initiation, and subsequent follow through with treatment. The rate of osteoporosis treatment after fracture in the absence of FLS care models is typically below 30% and as low as 5%.<sup>[16,17,19,27,28]</sup> With the implementation of FLS frameworks, the rate of treatment ranges from 57% to 96%.<sup>[19,23,29–32]</sup> Specifically within the Geisinger Health System, their HiROC model has led to an increase in treatment of highrisk patients to 80% compared to only 32% with primary care providers.<sup>[25]</sup> Postfracture evaluation rates have shown similar increases.<sup>[19,29–31,33,34]</sup> The implementation of Own the Bone programs increased from 14 sites in 2005 to 2006 to 177 sites in 2015, with the subsequent rate of BMD testing rising to the 90th percentile per HEDIS outcome data.<sup>[23]</sup> As many as 275 sites with Own the Bone have been established in the US. Most importantly, the risk of secondary fractures has been shown to decrease with these models<sup>[19,32]</sup> For example, the Kaiser Healthy Bones Program led to a 37.2% decrease in hip fracture incidence with an associated cost savings of \$30.8 million.<sup>[32]</sup> The totality of these national changes is reflected in 2018 HEDIS data demonstrating a BMD testing rate between 72.5% and 79.6% and a treatment rate between 41.2% and 49.6% following fragility fracture.<sup>[17]</sup>

### 3.4. Barriers

There are numerous barriers to the widespread realization of successful osteoporosis management systems in the US.<sup>[35]</sup> First, the fragmented medical infrastructure in the US often leads to a disconnect between acute care and outpatient settings, complicating patient capture and care arrangements, frequently resulting in patients being lost to appropriate follow-up. This can be somewhat circumvented in more self-contained US health systems such as Kaiser Permanente and Geisinger. Programs such as Own the Bone, however, have been moderately successful in creating bone health programs in open systems, improving care for the patients with fragility fractures and osteoporosis. These programs come at some cost—identification and tracking of patients across various treatment settings can be time and resource-intensive, requiring qualified and dedicated personnel. Securing funding to support the salary of FLS coordinators and their services commonly is complicated within the single payment allocated to the Diagnosis Related Group for fracture treatment.

Ultimately, change to the US system of osteoporosis care and fracture prevention is also dependent on the coordination of Centers for Medicare and Medicaid Services (CMS) and Medicare. Developing reportable quality measures will facilitate the establishment of well-defined standards of care to drive provider incentives to enable not just acute fracture care, but care for the underlying bone disease. In creating newer models to incorporate FLS services focused not just on fractures but bone health, improved secondary fracture prevention can be realized. But, in part, there would ideally need to be a separation from acute fracture care payment bundles and the development of a postfracture care bundled payment focusing on bone health and secondary fracture prevention to successfully address the existing care gap. It is believed that reduction of subsequent fractures by 5% to 20% and utilizing BMD testing in an additional 10% to 50% of new fracture patients would translate into between \$250 million and \$950 million in savings to the healthcare system in the US.<sup>[11]</sup>

### 4. Conclusions

Osteoporosis care in the US has shown significant improvement over the past 2 decades with the development and implementation of coordinator-based interdisciplinary fragility fracture care teams. While numerous organization recommendations exist regarding standards of diagnosis and treatment, universal quality measures have not been adopted. The inability to separate long term osteoporosis management from the acute fracture setting with regards to payment has proved to be a significant impediment to sustained care. The development of osteoporosis care standards to drive payer reimbursement, and ultimately funding for dedicated personnel and resources, is key moving forward.

### References

- Hansen D, Pelizzari P, Pyenson B. Medicare Cost of Osteoporotic Fractures. Milliman Research Report. Published 2021. Available at: <https://www.milliman.com/en/insight/medicare-cost-of-osteoporotic-fractures>.
- Siris ES, Adler R, Bilezikian J, et al. The clinical diagnosis of osteoporosis: a position statement from the National Bone Health Alliance Working Group. *Osteoporos Int* 2014; 25:1439–1443.
- Cosman F, de Beur SJ, LeBoff MS, et al. Clinician's guide to prevention and treatment of osteoporosis. *Osteoporos Int* 2014; 25:2359–2381.
- Camacho PM, Petak SM, Binkley N, et al. American association of clinical endocrinologists/American college of endocrinology clinical practice guidelines for the diagnosis and treatment of postmenopausal osteoporosis-2020 update. *Endocr Pract* 2020; 26:1–46.
- American Academy of Orthopaedic Surgeons. Position Statement: Recommendations for Enhancing the Care of Patients With Fragility Fractures. Published Online 2009. Available at: [https://www5.aaos.org/uploadedFiles/1159\\_Orthopaedic\\_Care\\_of\\_Patients\\_with\\_Fragility\\_Fractures.pdf](https://www5.aaos.org/uploadedFiles/1159_Orthopaedic_Care_of_Patients_with_Fragility_Fractures.pdf).
- Bunta AD. It is time for everyone to own the bone. *Osteoporos Int* 2011; 22 Suppl 3:477–482.
- Curry SJ, Krist AH, Owens DK, et al. Screening for osteoporosis to prevent fractures us preventive services task force recommendation statement. *J Am Med Assoc* 2018; 319:2521–2531.
- Ward RJ, Roberts CC, Bencardino JT, et al. ACR appropriateness criteria® osteoporosis and bone mineral density. *J Am Coll Radiol* 2017; 14:S189–S202.
- Qaseem A, Forcica MA, McLean RM, et al. Treatment of low bone density or osteoporosis to prevent fractures in men and women: a clinical practice guideline update from the American college of physicians. *Ann Intern Med* 2017; 166:818–839.
- Lim LS, Hoeksema LJ, Sherin K. Screening for osteoporosis in the adult U.S. population. ACPM position statement on preventive practice. *Am J Prevent Med* 2009; 36:366–375.
- Watts NB, Adler RA, Bilezikian JP, et al. Osteoporosis in men: an endocrine society clinical practice guideline. *J Clin Endocrinol Metab* 2012; 97:1802–1822.
- Committee on Practice Bulletins-Gynecology TAC of O and GACOG practice bulletin N. 129. osteoporosis. *Obstet Gynecol* 2012; 120:718–734.
- Jeremiah MP, Unwin BK, Greenawald MH, et al. Diagnosis and management of osteoporosis. *Am Fam Physician* 2015; 92:261–268.
- Management of osteoporosis in postmenopausal women: 2010 position statement of The North American Menopause Society. *Menopause* 2010; 17:25–54.
- Eisman JA, Bogoch ER, Dell R, et al. Making the first fracture the last fracture: ASBMR task force report on secondary fracture prevention. *J Bone Miner Res* 2012; 27:2039–2046.
- Yusuf AA, Matlon TJ, Grauer A, et al. Utilization of osteoporosis medication after a fragility fracture among elderly Medicare beneficiaries. *Arch Osteoporos* 2016; 11:31.
- Osteoporosis Testing and Management in Older Women. The National Committee for Quality Assurance (NCQA) HEDIS Measures. Accessed August 10, 2021. Available at: <https://www.ncqa.org/hedis/measures/osteoporosis-testing-and-management-in-older-women/>.
- Skedros JG, Holyoak JD, Pitts TC. Knowledge and opinions of orthopaedic surgeons concerning medical evaluation and treatment of patients with osteoporotic fracture. *J Bone Joint Surg Am* 2006; 88:18–24.
- Miki RA, Oetgen ME, Kirk J, et al. Orthopaedic management improves the rate of early osteoporosis treatment after hip fracture a randomized clinical trial. *J Bone Joint Surg Am* 2008; 90:2346–2353.
- 2011; Marsh D, Åkesson K, Beaton DE, et al. Coordinator-based systems for secondary prevention in fragility fracture patients. *Osteoporos Int*. 22:2051–2065.
- McLellan AR, Gallacher SJ, Fraser M, et al. The fracture liaison service: Success of a program for the evaluation and management of patients with osteoporotic fracture. *Osteoporos Int* 2003; 14:1028–1034.
- Tosi LL, Gliklich R, Kannan K, et al. The american orthopaedic association's "own the bone" initiative to prevent secondary fractures. *J Bone Joint Surg Am* 2008; 90:163–173.
- Bunta AD, Edwards BJ, MacAulay WB, et al. Own the bone, a systembased intervention, improves osteoporosis care after fragility fractures. *J Bone Joint Surg Am* 2016; 98:e109.
- Dell R. Fracture prevention in Kaiser Permanente Southern California. *Osteoporos Int* 2011; 22 Suppl 3:457–460.
- Oleingski TP, Maloney-Saxon G, Matzko CK, et al. High-risk osteoporosis clinic (HiROC): improving osteoporosis and postfracture care with an organized, programmatic approach. *Osteoporos Int* 2015; 26:801–810.
- Mears SC, Suk M, Cobbe F, et al. International geriatric fracture society CORE certification: turning knowledge into action. *Geriatr Orthop Surg Rehabil* 2014; 5:91–92.
- Gardner MJ, Flik KR, Mooar P, et al. Improvement in the undertreatment of osteoporosis following hip fracture. *J Bone Joint Surg Am* 2002; 84:1342–1348.
- Rozenal TD, Makhni EC, Day CS, et al. Improving evaluation and treatment for osteoporosis following distal radial fractures: a prospective randomized intervention. *J Bone Joint Surg Am* 2008; 90:953–961.
- Harrington JT, Barash HL, Day S, et al. Redesigning the care of fragility fracture patients to improve osteoporosis management: a health care improvement project. *Arthritis Rheum* 2005; 53:198–204.

30. Roy A, Heckman MG, O'Connor MI. Optimizing screening for osteoporosis in patients with fragility hip fracture. *Clin Orthop Relat Res* 2011; 469:1925–1930.
31. Lee RH, Lyles KW, Pearson M, et al. Osteoporosis screening and treatment among veterans with recent fracture after implementation of an electronic consult service. *Calcif Tissue Int* 2014; 94:659–664.
32. Dell R, Greene D, Schelkun SR, et al. Osteoporosis disease management: the role of the orthopaedic surgeon. *J Bone Joint Surg Am* 2008; 90 Suppl 4:188–194.
33. Sarfani S, Scrabeck T, Kearns AE, et al. Clinical efficacy of a fragility care program in distal radius fracture patients. *J Hand Surg Am* 2014; 39:664–669.
34. Cosman F, Nicpon K, Nieves JW. Results of a fracture liaison service on hip fracture patients in an open healthcare system. *Aging Clin Exp Res* 2017; 29:331–334.
35. Curtis JR, Silverman SL. Commentary: the five Ws of a fracture liaison service: why, who, what, where, and how? In osteoporosis, we reap what we sow. *Curr Osteoporos Rep* 2013; 11:365–368.