

Position Statement

Osteoporosis/Bone Health in Adults as a National Public Health Priority

This Position Statement was developed as an educational tool based on the opinion of the authors. It is not a product of a systematic review. Readers are encouraged to consider the information presented and reach their own conclusions.

Osteoporosis is a widespread metabolic bone disease characterized by decreased bone mass and poor bone quality. It leads to an increased frequency of fractures of the hip, spine, and wrist. Osteoporosis is a global public health problem currently affecting more than 200 million people worldwide. In the United States alone, 10 million people have osteoporosis, and 18 million more are at risk of developing the disease. Another 34 million Americans are at risk of osteopenia, or low bone mass, which can lead to fractures and other complications. Low bone mass is a growing global health burden, and likely reflects only a small part of the true burden of osteoporosis, given that bone mineral density (BMD) does not indicate other important components of bone strength. Fragility fractures have a morbidity and mortality related to them that may be avoided more effectively if information is provided in clinical and public health prevention and management programs.¹⁴

Eighty percent of people who suffer osteoporosis are females, and the incidence of osteoporosis increases with age.¹ Osteoporosis will affect approximately 1/10th of women aged 60, one-fifth of women aged 70, two-fifths of women aged 80 and two-thirds of women aged 90.¹⁹ Although more commonly seen in females, osteoporosis in males remains underdiagnosed and underreported.⁸

The lifetime risk for fracture may be rising in certain populations, specifically Hispanic females. According to the 2004 Surgeon General's Report on Bone Health and Osteoporosis, the prevalence of osteoporosis in Hispanic females is similar to that found in Caucasian females. Recent data has shown that the prevalence of osteoporosis and related fractures was highest among Asian Americans, especially those ages 70 and older. In addition, the study indicated a low proportion of African Americans females and males of any race with fractures typically associated with osteoporosis or with previous diagnoses of osteoporosis. This likely reflects low rates of osteoporosis recognition and testing among these patient populations. There is little information available regarding racial differences in osteoporosis among males.

Each year, 1.5 million fractures are attributed to osteoporosis, including 350,000 hip fractures.^{3,4,10} Seventy percent of those suffering fractures from osteoporosis do not return to their pre-injury status. Current estimates place the total direct cost of osteoporosis and related fractures between \$17 billion and \$20.3 billion dollars. For comparison, the total costs of breast cancer is \$13 billion

while heart disease is approximately \$19 billion.^{9,20} The cumulative cost over the next two decades is estimated to be \$474 billion. In addition to a financial burden, osteoporosis-related fractures bring a burden of pain and disability, resulting in lost work time or inability to perform daily living activities.⁹ The consequences of osteoporotic fractures include re-fractures, excess mortality and morbidity, and economic costs. While hip and vertebral fractures are notable, the importance of non-hip nonvertebral fractures are collectively much more numerous and make a larger contribution to the burden of osteoporosis on the population.¹⁵

The estimation of the total cost of osteoporosis must include both incident fractures and prevalent fractures. Incident fractures include fractures in the current setting, and prevalent fractures include those fractures in a previous setting. The estimates for osteoporosis and fractures should be considered in the setting of both incident and prevalent fractures to forecast the current and future healthcare burden for patients, payers and society.¹⁶

People in the United States are living longer. World Health Organization (WHO) data from 2010 predicts the average life expectancy of males to be 75.9 and that of females to be 81.2 years.^{7,18} With the dramatic growth of the elderly population and the rise in the incidence of fractures at earlier ages, osteoporosis has become a major public health problem of epidemic proportions. Osteoporosis can be classified into two broad categories: primary and secondary osteoporosis.⁵ Primary osteoporosis (more common in females) is, by far, the most common form of the disease and includes:

- Postmenopausal osteoporosis;
- Age-associated osteoporosis, previously termed senile;
- Osteoporosis affecting a majority of individuals age 70 and older; and
- Idiopathic osteoporosis affecting premenopausal females and middle-aged males.

Secondary osteoporosis (more common in males) is a disease in which an identifiable agent or disease process causes loss of bone tissue and includes:

- Inflammatory disorders;
- Disorders of bone marrow cellularity;
- Endocrine disorders of bone remodeling; and
- Medication induced osteoporosis.

Osteoporosis reflects the inadequate accumulation of bone during growth and maturation, excessive losses thereafter, or both. Although knowledge of the causes of osteoporosis is incomplete, genetic, endocrine and lifestyle factors are contributory.⁴ Since today's effective and safe treatments primarily preserve existing bone tissue, prevention (which involves maximizing maturational gains in bone density and minimizing post-maturity losses) emerges as the crucial current disease prevention strategy.⁴

Lack of adequate vitamin D contributes to poor bone health. Worldwide, 1 billion people have vitamin D deficiency or insufficiency. In the United States and Europe, 40 to 100 percent of elderly males and females still living in the community (not in nursing homes) are deficient in vitamin D. More than 50 percent of post-menopausal females being treated for osteoporosis had suboptimal levels of vitamin D. Children, young adults, and breast fed infants are also at risk for bone health problems due to vitamin D deficiency, theoretically putting them at risk for development of full blown osteoporosis later in life.

The American Academy of Orthopaedic Surgeons (AAOS) believes that increased federal funding for research and education programs is essential to reduce the growth rate of osteoporotic fractures.

Based upon current scientific knowledge about osteoporosis, it is further believed physician education programs should include the following information:

- Risk factors associated with osteoporosis include
 - Insufficient calcium intake
 - Vitamin D deficiency
 - Sedentary lifestyle
 - Smoking
 - Excessive alcohol consumption
 - Family history of fractures
 - Loss of endogenous sex hormones
 - Chronic glucocorticoid use
 - A small, slender body
 - Caucasian, Hispanic, Native American, or Asian American ethnicity
- All ethnic groups need to be considered at risk for metabolic bone disease, including but not limited to osteoporosis
- The importance of adequate dietary intake of calcium, vitamin D and other nutrients, starting at an early age, especially for young girls
- Testing of blood levels of these nutrients should be considered even in the young and in all ethnic groups, especially if there is significant fracture history
- Emphasis on diagnosis of other, possibly co-existing metabolic bone diseases
- Efficacy and safety of current estrogen and other hormone and estrogen receptor modifiers (SERMs) to prevent and treat osteoporosis
- Efficacy and safety of bisphosphonates, calcitonin, biologics (such as romosozumab-aqqg and denosumab), teriparatide, evolving therapies to prevent and treat osteoporosis, and all FDA-approved medications
- Guidelines on sufficient exercise and activity
- Fall prevention strategies and rehabilitation, including safety education, vision, and hearing checks

Clinicians need to be cognizant that all ethnic groups are susceptible to osteoporosis, and the disease is under diagnosed in the African American population. Based on nationally representative estimates, a considerable proportion of people with osteoporotic fractures have not received a diagnosis of osteoporosis (prior to or after their fracture). This is especially true among males and African Americans. Early diagnosis of osteoporosis is usually established by a combination of a complete medical history and physical examination, skeletal radiographs, bone densitometry and specialized laboratory tests.

The care for patients with established osteoporosis should include:

- Early diagnosis of potentially treatable secondary types of osteoporosis
- Decreasing fracture risk by utilizing medications, such as SERMs, bisphosphonates, denosumab, romosozumab-aqqg, teriparatide, and all FDA-approved medications
- Exercise and activity programs

- Injury prevention strategies
- Optimizing nutrition and lifestyle variables to decrease risk

While there is much to be learned about the causes of osteoporosis, there is sufficient current knowledge to undertake therapeutic action today. Effective new regimens that stimulate bone formation will require increased federal research support. Recent studies have shown the declining rates of osteoporosis management following fragility fractures from 2000-2009 in the US. While primary fracture prevention is the goal, secondary prevention is critical to prevent the future costs to the patient and society. Every orthopaedic surgeon should work diligently to participate in prevention and treatment of osteoporosis and fragility fracture care.¹⁷

To minimize future predicted costs, morbidity, and mortality from increasing numbers of osteoporotic fractures in our rapidly aging population, the AAOS recommends that osteoporosis should become a national public health priority.⁶ While current research demonstrates that pharmacological therapies can decrease the risk of fractures, new research is required to evaluate the role of each of our current therapies and to allow us to develop new team-oriented medical managements and therapeutic agents that can strengthen aging bones. Furthermore, ongoing education of patients, healthcare personnel and physicians must continue to insure the best clinical practice, management and healthcare delivery of bone health.

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