**Osteoporosis Overview**

*This is a short overview with links for further information on this large topic.*

*Background/Significance:* Osteoporosis is a systemic skeletal disease characterized by low bone mass and microarchitectural deterioration of bone tissue with a consequent increase in bone fragility and fracture risk.[[1]](#endnote-1) It remains under recognized and undertreated, more so in men, due to a perception that it is a disease primarily affecting women as they age.[[2]](#endnote-2) Hip fractures are usually the result of a lateral fall in individuals with underlying osteoporosis or low bone mass. Hip fractures are associated with significant morbidity, mortality, increased risk of institutionalization and cost, especially in men.[[3]](#endnote-3),[[4]](#endnote-4) One in three men die in the first year after a hip fracture and one third will fracture again.[[5]](#endnote-5)

*Epidemiology:* Fracture incidence in women starts increasing at age 55 and in men about 10 years later. The remaining lifetime risk of osteoporotic fracture at age 50 is 20-25% in men vs. 45-55% in women for Caucasian populations.[[6]](#endnote-6) BMD-defined osteoporosis and osteopenia (using female references) occur in respectively 4% and 38% of US men vs. 16% and 61% of women over 50 years.[[7]](#endnote-7) Men account for 39% of 9 million osteoporotic fractures (hip, spine, humerus, forearm, and other sites) worldwide.[[8]](#endnote-8) As per CDC, by 2030, the number of hip fractures among men is expected to increase 51.8% (PI=15.9-119.4%), while the number among women is expected to decrease 3.5% (PI=-44.3%-37.3%).[[9]](#endnote-9)

*Pathophysiology:* Fracture risk is determined by falls risk, bone size and geometry, bone mineral density (BMD), microarchitecture, higher peak bone mass and the balance of bone resorption and formation.[[10]](#endnote-10) Falls, sarcopenia and frailty are independent and potentially modifiable fracture risk factors. Sarcopenia correlates negatively with bone density, geometry, balance and positively with falls and fractures.[[11]](#endnote-11) Poor physical performance and clinical tests of balance and frailty also correlate with BMD and bone microarchitecture.[[12]](#endnote-12) A number of secondary causes can contribute to development of osteoporosis, especially in men, including use of medications like glucocorticoids, androgen deprivation therapy, lifestyle factors like smoking, alcohol abuse, lack of physical activity, low body weight, etc.

*Diagnosis/Screening:*

As per the [National Osteoporosis Foundation Osteoporosis Guideline](http://nof.org/files/nof/public/content/file/950/upload/523.pdf) (2013), BMD testing should be considered in the following individuals (based on expert consensus):

1. Women age 65 and older and men age 70 and older, regardless of clinical factors
2. Younger postmenopausal women, women in the menopausal transition and men age 50 to 69 with clinical risk factors for fracture
3. Adults who have a fracture after age 50
4. Adults with a condition (e.g. rheumatoid arthritis) or taking a medication (e.g. glucocorticoids in a daily dose >5mg prednisone or equivalent for > three months associated with low bone mass or bone loss

[US Preventive Services Task Force](http://www.uspreventiveservicestaskforce.org/uspstf/uspsoste.htm) does not support screening in men.

Diagnosis: Clinical evaluation (history, physical exam, selected blood test, as indicated) and DXA BMD <-2.5 SD

[Fracture risk assessment tools like FRAX](http://www.shef.ac.uk/FRAX/) may be used to target DXA screening or osteoporosis therapy, but its use in men requires further investigation.

Bone turnover markers are currently not recommended for clinical use.

*Treatment:*

Indications for pharmacological treatment: NOF guideline recommends treating osteoporosis after hip or vertebral fractures or with T-scores<-2.5, as well as, in postmenopausal women and men >50 with osteopenia, if FRAX-based 10-year hip or major osteoporotic fracture probability is >3% or >20%, respectively.

Pharmacologic options available include calcium and vitamin D supplementation (1200mg/800IU), antiresorptive drugs (e.g. alendronate, risedronate, zoledronic acid, denosumab), selective estrogen modulators (raloxifene), anabolic drugs like intermittent parathyroid hormone (PTH) therapy and androgens for hypogonadal men, although not without safety concerns, especially in older men.[[13]](#endnote-13)[[14]](#endnote-14)

Here are currently available resources for additional information:

AHRQ Osteoporosis Toolkit:Treatment To Prevent Fractures in Men and Women With Low Bone Density or Osteoporosis: Update of a 2007 Report AHRQ Pub. No. 12-EHC023-1 March 2012 http://effectivehealthcare.ahrq.gov/index.cfm/search-for-guides-reviews-and-reports/?pageaction=displayproduct&productID=1007

VHA 2011 Information letter Osteoporosis in men- gone?- could not find it on the VA website

VHA HSRD, Evidence Synthesis Program: [Screening for Osteoporosis: Who and How?](http://www.hsrd.research.va.gov/publications/esp/Osteoporsis-2007-REPORT.pdf.) (2007).

[Bone health and Osteoporosis: US Surgeon General](http://www.surgeongeneral.gov/library/reports/bonehealth/SurgeonGeneralOutreachKit_LowRes.pdf) (2007)

Patient education materials:

Available from NOF: The men’s guide to Osteoporosis

Our video on Osteoporosis in men-where is the link on our website?

1. NIH Consensus Development Panel on Osteoporosis Prevention, Diagnosis and Therapy. JAMA 2001;285-785-795. [↑](#endnote-ref-1)
2. Leslie WD, LaBine L, Klassen P et al. Closing the gap in postfracture care at the population level: a randomized controlled trial. Canadian Medical Association Journal 2012; 184:290-296. [↑](#endnote-ref-2)
3. Bass E, Campbell RR, Werner D, Nelson A and Bulat T. Inpatient Mortality Trends for Hip Fractures in the VHA. J Nursing Rehab 2004;29:215-220. [↑](#endnote-ref-3)
4. Burge R, Dawson-Hughes B, Solomon DH et al. Incidence and economic burden of osteoporosis-related fractures in the United States., 2005-2025. Journal of Bone and Mineral research2007;22:465-475. [↑](#endnote-ref-4)
5. vonFriesendorff , McGuigan FE, Besjakov J et al. Hip fracture in men-survival and subsequent fractures: a cohort study with 22 year follow-up. Journal of the American Geriatrics Society 2011;59:806-813. [↑](#endnote-ref-5)
6. Nguyen HD, Ahlborg HG, Center JR et al. Residual lifetime risk of fractures in women and men. Journal of Bone and Mineral research 2007;22;781-788 [↑](#endnote-ref-6)
7. Looker AC, Melron 3rd LJ, Borrud LG et al. Changes in femur neck bone density in US adults between 1988-1994 and 2005-2008: demographic patterns and possible determinants. Osteoporosis International 2012;23:771-780. [↑](#endnote-ref-7)
8. Jonell O and Kanis JA. An estimate of the worldwide prevalence and disability associated with osteoporotic fractures. Osteoporosis International 2006;17:1726-1733. [↑](#endnote-ref-8)
9. Stevens JA and Rudd RA. The impact of decreasing US hip fracture rates on future hip fracture estimates.Osteoporos Int. 2013; 24:2725-2728. [↑](#endnote-ref-9)
10. Laurent M, Gielen E, Claessens F et al. Osteoporosis in older men: recent advances in pathophysiology and treatment. Best Practice and Research Clinical Endocrinology & Metabolism. 2013;27:527-539. [↑](#endnote-ref-10)
11. Gielen E, Verschueren S, O’neill TW et al. Musculoskeletal frailty: a geriatric syndrome at the core of fracture occurrence in older age. Calcified tissue International 2012;91:161-177. [↑](#endnote-ref-11)
12. Blaizot S, Boutroy S, Vilayphiou N et al. Poor bone microarchitecture in older men with impaired physical performance- the STRAMBO study. Osteoporosis International 2012;23:2785-2796. [↑](#endnote-ref-12)
13. Levis S, Theodore G. Summary of AHRQ comparative effectiveness review of treatment to prevent fractures in men and women with low bone mass or osteoporosis: Update of 2007 report. J Manag Care Pharm 2012; 18(4 suppl B):S1-15. [↑](#endnote-ref-13)
14. Fernandez-Balsells MM, Murad MH, Lane M et al. Adverse effects of testosterone therapy in adult men: a systematic review and meta-analysis. Journal of Clinical Endocrinology and Metabolism 2010;95:2560-2575. [↑](#endnote-ref-14)