

Declaration on Vitamin D in Osteoporosis Management

From the European Summit on the Role of Vitamin D in the Management of Osteoporosis: a MetaForum

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From the Editor-in-Chief

On October 2005 a multidisciplinary group of delegates, which included endocrinologists, geriatricians, rheumatologists, orthopedic surgeons, gynecologists, general physicians, nurses, and patient group representatives were invited to Dublin, Ireland to draw a Consensus of the group's opinions to form a document that would set out a call for action for professional and patient organizations.

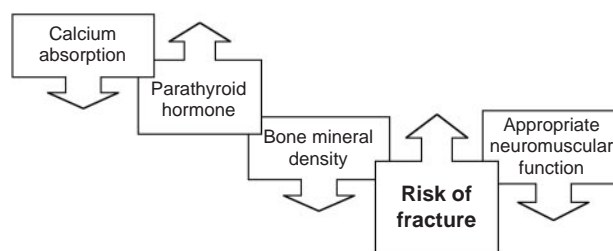
The seven lectures presented by the Faculty members included the impact of osteoporosis, the role of vitamin D both in physiology and in the prevention of fractures and falls in the elderly, the widespread prevalence of vitamin D inadequacy, and the patient and physician knowledge and attitude to vitamin D supplementation. The speakers were challenged with numerous questions by the skilled and experienced audience and a MetaForum newsletter was generated (Table I).

The Declaration document encompassed action points to be accomplished and measures of success at given times. As some of the deadlines for reaching the proposed goals are approaching, it could of use to have a thought on what has been accomplished, how much needs to be done and the possible ways to hit the targets.

Table I - Declaration Summary.

- Vitamin D inadequacy (generally defined as < 30 ng/ml or < 75 nmol/l) is common worldwide.
- Individuals have difficulty getting enough vitamin D.
- Vitamin D is essential for calcium absorption.
- Vitamin D supplementation has been shown to reduce the risk of fracture and falls and helps to improve muscle function (Fig. 1).
- Vitamin D is an essential part of osteoporosis management.
- The efficacy of prescription treatments for osteoporosis is improved by ensuring that patients get enough vitamin D.
- There is an urgent need for all interested bodies to promote adequate vitamin D intake in patients with osteoporosis.

Vitamin D inadequacy has important consequences



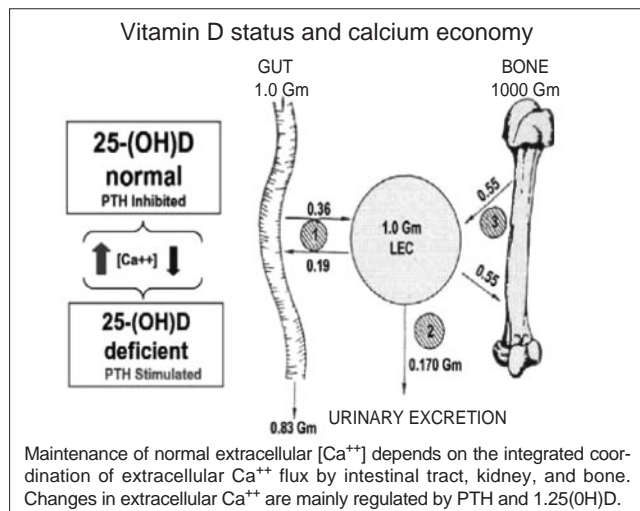
Declaration points

1. Vitamin D is essential for calcium absorption and bone health in men and women. Low levels of vitamin D may lead to suboptimal calcium absorption, secondary hyperparathyroidism with high bone turnover and an increased risk of fractures, especially among those with osteoporosis and in older people (≥ 65 yrs).
2. Vitamin D is particularly important for maintaining muscle function and balance. Vitamin D inadequacy may contribute to the risk of falls and fractures.
3. Vitamin D inadequacy among older women and men worldwide is widespread regardless of geographical location or season.
4. Vitamin D is an essential part of osteoporosis management. It helps to maximise the effectiveness of prescribed medicine in the prevention of fractures.
5. All patient and professional organisations supporting patients with osteoporosis should provide current information on the critical role of vitamin D in helping reducing falls and fracture risk.
6. Primary prevention of osteoporosis starts early in life and continues throughout life. As well as a balanced diet and daily weight-bearing exercise, adequate caloric intake, calcium and vitamin D are essential for the prevention of osteoporosis.

①

Vitamin D is essential for calcium absorption and bone health in men and women. Low levels of vitamin D may lead to suboptimal calcium absorption, secondary hyperparathyroidism with high bone turnover and an increased risk of fractures, especially among those with osteoporosis and in older people (≥ 65 yrs).

- Action point:
Identify the key facts which will help women and men as well as their physicians to understand the importance of vitamin D in the management of osteoporosis.
- Measuring success:
In clinical practice, patients with vitamin D inadequacy are so common that widespread treatment is necessary, but measurement of serum 25(OH)D levels is not. Consistent with European Guidelines, we should aim to at least double the number of osteoporosis patients getting an adequate intake of vitamin D on a regular basis.



Current recommendations for vitamin D intake

United States

The IOM has defined adequate daily intake of vitamin D according to age:

- Adults up to age 50: 200 IU (5 μ g)
- Adults 51-70: 400 IU (10 μ g)
- Adults > 70: 600 IU (15 μ g)

Europe

The Scientific Committee for Food of the Commission of the European Communities recommends

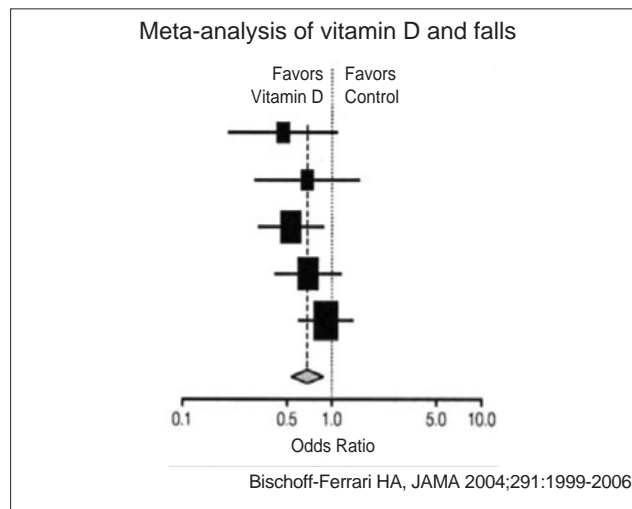
- 400 IU (10 μ g) of vitamin D daily for the elderly (≥ 65 years of age)

BACKGROUND INTAKE: 5 μ g (200 IU/d)

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Vitamin D is particularly important for maintaining muscle function and balance. Vitamin D inadequacy may contribute to the risk of falls and fractures.

- Action point:
In falls management, incorporate advice on avoiding vitamin D inadequacy.
- Measuring success:
Agreement by falls services to routinely correct vitamin D inadequacy.



Vitamin D and muscle strength

- Low vitamin D levels and reversible myopathy in patients with osteomalacia and uremia
- Vitamin D receptors in skeletal muscle
- Vitamin D deficiency causes selective atrophy of the rapidly reacting (type II) fibers
- Increased number and cross sectional area of fast-twitch muscle fibers after vitamin D treatment
- Vitamin D plus calcium reduce the risk of falling by 49% compared to calcium alone in the elderly

Adapted from Pent Dial Int. 16:S305, 1996; J Biol Chem. 260:8882, 1985; J Bone Miner Res. 18:343, 2003; Lancet. 2:626, 1976; Clin Sci. 56:157, 1979; Aging 12:455, 2000

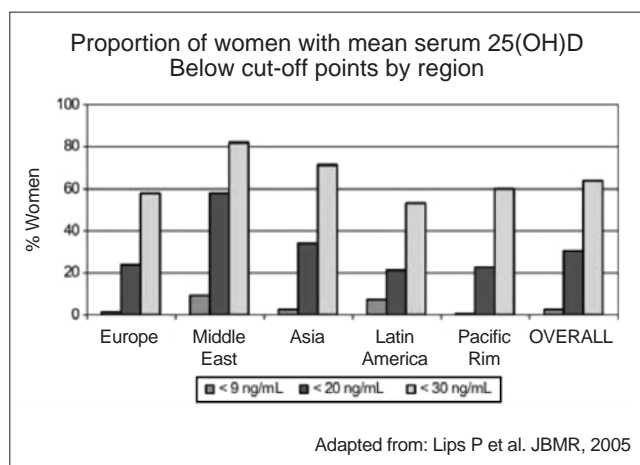
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Vitamin D inadequacy among older women and men worldwide is widespread regardless of geographical location or season.

• Action point:
Raise physician awareness of the high prevalence of vitamin D inadequacy and the need to ensure that it is corrected.

• The key points are:
– very high prevalence of vitamin D inadequacy everywhere;
– there are multiple benefits from vitamin D on muscle function, falls and bone health;
– vitamin D has a good safety profile, even in higher doses.

• Measuring success:
In patients with osteoporosis, at least double the percentage who take vitamin D by end 2010.



Acceptable upper limit	2000 IU/d
No observed adverse effect level NOAEL [25(OH)D → 56 ng/ml]	10000 IU/d
Lowest observed adverse effect level LOAEL [25(OH)D → 88 ng/ml]	40000 IU/d
Vitamin D intoxication [25(OH)D → > 240 ng/ml]	?

Adapted from: Am J Nutr. 69:842, 1999; Am J Clin Nutr. 80:1706S, 2004

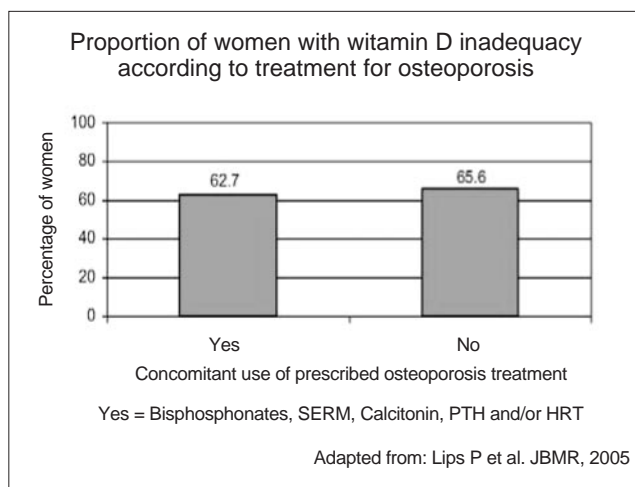
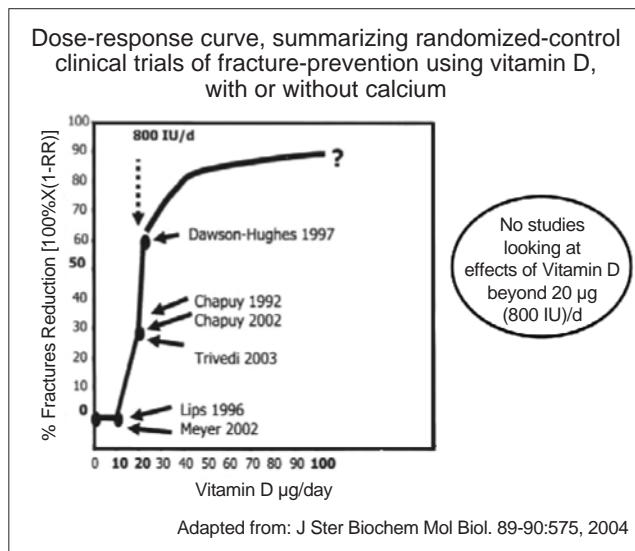
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Vitamin D is an essential part of osteoporosis management. It helps to maximise the effectiveness of prescribed medicine in the prevention of fractures.

• Action point:
Identify the key facts which will help women and men and their physicians to understand the importance of vitamin D in the management of osteoporosis.

• The key points are:
– vitamin D is essential to help prevent falls and fractures;
– you cannot absorb enough calcium without vitamin D;
– most people don't get enough vitamin D from food and sunlight;
– almost everyone should get vitamin D as part of their treatment, alongside an effective prescribed medicine. Vitamin D has a good safety profile, even in higher doses.

• Measuring success:
Increase in healthcare professional recommendation to include vitamin D together with osteoporosis therapies with proven fracture risk reduction efficacy.



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All patient and professional organisations supporting patients with osteoporosis should provide current information on the critical role of vitamin D in helping reducing falls and fracture risk.

• Action point:
Develop educational materials to explain the importance of vitamin D as a critical role in muscle function, bone health and osteoporosis management and encourage sustained compliance with established national guidelines.

• Measuring success:

All osteoporosis patient group literature and websites to include accurate guidance on importance of vitamin D and adequate calcium absorption by end 2007.

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Primary prevention of osteoporosis starts early in life and continues throughout life. As well as a balanced diet and daily weight-bearing exercise, adequate caloric intake, calcium and vitamin D are essential for the prevention of osteoporosis.

• Action point:

Include osteoporosis prevention in schools and general health education programmes.

Key references

1. Calvo MS, Whiting SJ, Barton CN. Vitamin D intake: a global perspective of current status. *J Nutr.* 2005;135:310-6.
2. Bischoff-Ferrari HA, Dawson-Hughes B, Willett WC et al. Effect of Vitamin D on falls: a meta-analysis. *JAMA.* 2004;291:1999-2006.
3. Burns J, Paterson CR. Single dose vitamin D treatment for osteomalacia in the elderly. *Br Med J (Clin Res Ed).* 1985;290:281-2.
4. Dawson-Hughes B, Harris SS, Krall EA, Dallal GE. Effect of calcium and vitamin D supplementation on bone density in men and women 65 years of age or older. *N Engl J Med.* 1997;337:670-6.
5. Henderson L, Irving K, Gregory J et al. The National Diet and Nutrition Survey: adults aged 19-64 years. Volume 3: Vitamin and mineral intake and urinary analytes. The Stationery Office. London (2003).
6. Larsen ER, Mosekilde L, Foldspang A. Vitamin D and calcium supplementation prevents osteoporotic fractures in elderly community dwelling residents: a pragmatic population-based 3-year intervention study. *J Bone Miner Res.* 2004;19:370-8.
7. Lips et al. Effect of long-term growth hormone treatment on bone mass and bone metabolism in growth hormone-deficient men. *J Bone Miner Res.* 2005;20:1778-84.
8. Nakamura K, Nashimoto M, Okuda Y et al. Fish as a major source of vitamin D in the Japanese diet. *Nutrition.* 2002;18:415-416.
9. Nakamura K, Nashimoto M, Hori Y, Yamamoto M. Serum 25-hydroxyvitamin D concentrations and related dietary factors in peri- and postmenopausal Japanese women. *Am J Clin Nutr.* 2000;71:1161-5.
10. Pfeifer M, Begerow B, Minne HW et al. Effects of a short-term vitamin D and calcium supplementation on body sway and secondary hyperparathyroidism in elderly women. *J Bone Miner Res.* 2000;15:1113-8.
11. Trivedi DP, Doll R, Khaw KT. Effect of four monthly oral vitamin D3 (cholecalciferol) supplementation on fractures and mortality in men and women living in the community: randomised double blind controlled trial. *BMJ.* 2003;326:469.
12. Vieth R. Why the optimal requirement for Vitamin D3 is probably much higher than what is officially recommended for adults. *J Steroid Biochem Mol Biol.* 2004;89-90:575-9.
13. World Health Organization and Food and Agriculture Organization of the United States. Vitamin and mineral requirements in human nutrition. Report of the joint FAO/WHO Expert Consultation. Available online at <http://whqlibdoc.who.int/publications/2004/9241546123.pdf> (accessed November 2005).