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

Calcium absorption
Parathyroid hormone
Bone mineral density
Appropriate neuromuscular function
Risk of fracture

Clinical Cases in Mineral and Bone Metabolism 2007; 4(2): 163-166
Declaration on Vitamin D in Osteoporosis Management

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.

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 µg)
- Adults 51-70: 400 IU (10 µg)
- Adults > 70: 600 IU (15 µg)

**Europe**

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

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

**BACKGROUND INTAKE: 5 µg (200 Ul/d)**

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:**
  - 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:**
  - Agreement by falls services to routinely correct vitamin D inadequacy.

**Meta-analysis of vitamin D and falls**

**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

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.

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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Dose-response curve, summarizing randomized-control clinical trials of fracture-prevention using vitamin D, with or without calcium

Proportion of women with mean serum 25(OH)D Below cut-off points by region

<table>
<thead>
<tr>
<th>Region</th>
<th>% Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>70</td>
</tr>
<tr>
<td>Middle East</td>
<td>90</td>
</tr>
<tr>
<td>Asia</td>
<td>80</td>
</tr>
<tr>
<td>Latin America</td>
<td>60</td>
</tr>
<tr>
<td>Pacific Rim</td>
<td>30</td>
</tr>
<tr>
<td>OVERALL</td>
<td></td>
</tr>
</tbody>
</table>

Adapted from: Lips P et al. JBMR, 2005

Defining the upper limit of vitamin D intake

<table>
<thead>
<tr>
<th>Limit Type</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Acceptable upper</td>
<td>2000 IU/d</td>
</tr>
<tr>
<td>observed adverse</td>
<td></td>
</tr>
<tr>
<td>effect level</td>
<td></td>
</tr>
<tr>
<td>NOAEL</td>
<td>10000 IU/d</td>
</tr>
<tr>
<td>Lowest observed</td>
<td></td>
</tr>
<tr>
<td>adverse effect level</td>
<td>40000 IU/d</td>
</tr>
<tr>
<td>LOAEL</td>
<td></td>
</tr>
<tr>
<td>[25(OH)D → 56 ng/ml]</td>
<td></td>
</tr>
<tr>
<td>[25(OH)D → 88 ng/ml]</td>
<td></td>
</tr>
<tr>
<td>Vitamin D</td>
<td></td>
</tr>
<tr>
<td>intoxication</td>
<td></td>
</tr>
<tr>
<td>[25(OH)D → &gt; 240 ng/ml]</td>
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</tbody>
</table>


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.

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