

# Vitamin D

## Nutritional guidelines for Europe

Should be based on EBM

Should be applicable to normal subjects

Special guidelines may be formulated for risk groups

Should preferably be harmonized in Europe

Present critical analysis of data suggest that

- Rickets is preventable by 400 IU/d and this should be widely applied in all infants and children
- Osteoporotic fractures can be reduced by intake of about 800 IU/d of D<sup>3</sup> plus adequate calcium
- Frequency of falls can be reduced by intake of about 800 IU/d of D<sup>3</sup> plus adequate calcium
  
- Guidelines for adolescents and young adults are largely by extrapolation
  
- (In)direct arguments suggest that serum 25OHD should preferably be  $\geq 20$  ng/ml in adults
- NO EBM for health benefit of higher vitamin D intake or serum 25OHD levels
- New RCT needed to refine optimal vitamin D status in different groups

# Vitamin D clinical guidelines 2012 and beyond

## 1. vitamin D and bone

### 1.1. vitamin D and vitamin D deficient rickets

problem: rickets still present or even endemic in parts of the world

present guidelines: 200 – 400 IU/d based on empirical data and few RCT

no guidelines for serum 25OHD but should be >12 ng/ml

**strategy: how to implement present guidelines worldwide =  
political/economical/social**

remaining questions:

- is high dose vitamin D intake of pregnant or lactating women an alternative?
- Is higher dose early in life better for later health (bone/immune/cancer...)?
- Is higher intake a health risk ( e.g. mutation in CYP24A1 NEJM 2011)?

Future: need for RCT of vitamin D dosage for infants/children with specific risk factors

# Vitamin D clinical guidelines 2012 and beyond

## 1. vitamin D and bone

### 1.2. vitamin D and bone health in adolescents

problem: how much vitamin D is needed during adolescence for optimal peak bone mass?

present guidelines: as for adults – very different from country to country

- IOM 2010: 600 IU/d covers need for “all”

  - Serum 25OHD: estimated at  $\geq 20$  ng/ml

- most European countries: ( $<$ ) 200 – 400 IU/d

Latest meta analysis (Winzenberg et al BMJ 2011): no clear benefit from vitamin D supplementation on bone

BUT: most studies used low amounts of vitamin D – no long term studies available

Future: need for new RCT with appropriate dosages

# Vitamin D clinical guidelines 2012 and beyond

## 1. vitamin D and bone

### 1.3. vitamin D and osteoporosis in adults/elderly

problem: growing incidence of osteoporotic fractures

present guidelines:

- no unanimity

Clinical data: large number of meta analyses of variable number of RCTs

Most would agree:

- vitamin D supplement 600 - 800 IU/d to elderly subjects decrease hip/all fracture risks by about 20% (with or without calcium?)
- Such dose of vitamin D will increase 25OHD >20 ng/ml in most subjects
- Such dose was used with calcium supplements in both arms of nearly all studies with specific anti osteoporosis drugs (bisphosphonates, SERMS, Strontium, Denosumab...) to show fracture efficacy
- Intermittent very high dose of vitamin D should be avoided

# Vitamin D: a pleiotrophic hormone for all seasons

## conclusions

1. vitamin D/VDR is essential for bone health

Rickets is preventable by low dose vitamin D (200-400 IU/d)

Osteoporotic fractures can be reduced by about 20% by  
calcium + ~ 800 IU vitamin D

250HD > 20 ng/ml = 50 nmol/L in most otherwise healthy  
subjects

Ps: high oral calcium supplements may increase CV risks  
most studies suggest that vitamin D and good calcium intake are  
needed for bone effects

# Vitamin D and global health

## Conclusions (2)

1. ..

2. Vitamin D/VDR endocrine system has/may have important **extra-skeletal effects**:

- valid hypothesis based on in vitro and preclinical data

- human studies: RCT are needed

- Not unlikely that maximal beneficial effects require higher levels ( $> 20$  ng/L) 25OHD and would require daily  $> 2000$  IU D/d and this has not been proven safely over long time periods in large number of subjects

remember: HRT – vitamin C - vitamin E –  
antioxidants – folic acid/ homocysteine ...