

# Vitamin D & Healthy Start

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# Vitamin D & Healthy Start

- What does it do?
- Sources
- Requirements
- Prevalence of low vitamin D
- At risk groups
- Supplements

# Vitamin D – what does it do?

- Bones
- Gut
- Kidneys

# Bones

- Critical for bone matrix formation & maturation
- Deficiency can lead to sig decrease in ability to absorb Ca
- Less Ca for bone mineralisation
- Low Ca trigger PTH secretion, so
- Increases release Ca from bones =
- Demineralisation of the skeleton

# Gut

- Vitamin D maximises gut Ca absorption
- Increases absorption from 10-15% to 30-40%
- Increases Phos absorption from 60% to 80%

# Kidneys

- Promotes uptake of Ca & Phos
- Increasing evidence that a poor vit D status may add to the risk of developing chronic diseases e.g.
- Hypertension, Diabetes Mellitus
- Cardiovascular disease, some forms of cancer
- Some inflammatory & autoimmune diseases

*Gregory et al 1995*

# Sources of Vitamin D

- Only 2 sources:
- Diet
- Provides only 20-30% of requirement
  
- Sun on the skin is main source
- Depends on sun's UVB rays on the skin converting vit D precursor to vit D

# UK Vit D Requirements

- RNIs for Infants & children up to 3yrs and
- Pregnant & BF mothers
- Set by COMA 1991
- No RNI for 4 – 64 yrs of age
- UK only country in the EU who does not have DRVs for vit D for this age range
- Why?
- Thought that sunlight is sufficient

# Should we set DRVs for vit D?

- Update on vit D - Position Statement SACN 2007
- Highlighting re-emergence of rickets in certain population gps
- High prevalence of low vit D status in UK population
- But SACN did not recommend any changes to the current DRVs

# UK prevalence of low vit D status <25 nmol/l

- 20% – 34% Asian children, 2 yrs old Lawson 1999
- 13% - 28% women childbearing age Ruston 2004
- 19 – 24 yr old women have lowest vit D levels
- 10 – 16% teenagers Gregory 2000

# Pregnancy, human milk & vit D

- Pregnant women with poor vit D status will produce children with lower vit D stores
- Human milk contains little vit D
- BF mothers with low vit D levels will provide even less than those who are vit D sufficient
- This impacts on the babies vit D status as well as their bone health in childhood

Javaid 2006, Copper 2005

# Vit D status in infants & toddlers

- Vit D status of breast & bottle fed infants & toddlers (8 – 24 months) found
- Low vit D status in 12% infants
- Sub optimal vit D status 40% infants
- Breast fed infants without vit D supplementation were 10x more likely to be vit D deficient compared to fully bottle fed infants

Gordon 2008

# The early years

- Retrospective cohort study demonstrated an association between premature infants supplemented with vit D in 1<sup>st</sup> yr of life & an increase in white bone mass at 12yrs of age  
Zamora 1999
- Increasing evidence that even a mild vit D insufficiency can have a detrimental effect on bone mineral mass in children & adolescent girls  
Cheng 2003, Lehtonen-Veromaa 2002, Outila 2001
- Poor vit D status will have an impact on markers for bone turnover in children  
Fares 2003

# At risk groups - DH recommend vit D supplement for:

- Pregnant and/or BF mothers
- Children up to 5 yrs
- BF infants from 6 months
- Formula fed infants < 500mls/day
- High skin pigmentation
- little/no sun exposure during summer months
- Living in institutions
- Covering up majority skin in summer months

# Why isn't sunshine enough?

- Seasonality, April – September, 10 am – 3 pm  
*Bouillon 2001*
- Pollution, can absorb sig amounts of UVB rays  
*Bouillon 2001, Scharla 1998*
- Ageing process, reduces levels of vit D precursor  
*Bouillon 2001, Scharla 1998*
- Obesity, increasing evidence highlighting a correlation between a high BMI & lower vit D levels

# Why isn't sunshine enough?

- Melanin, an effective sunscreen, darker skin requires longer sun exposure to achieve same vit D levels *Holick 2006*
- Avoidance of skin cancer, but also reduces vit D stores
- Clothing, covering up reduces vit D production *Bouillon 2001*
- Sunscreen creams, SPF  $\geq 8$  blocks vit D production by at least 95% *Bouillon 2001*

# Why isn't diet enough?

- Few natural, dietary sources
- Major natural source oily fish, small amts eggs, liver, meat
- Minimal fortification
- Dairy products in the UK are NOT fortified
- Mandatory to fortify margarine & infant formulae
- Some foods are fortified voluntarily e.g. some breakfast cereals, dairy products

# Vit D supplements for children & mothers

- DoH highlighted need to supplement
- Pregnant & BF mothers
- Infants & children up to 5 yrs
- To stop the escalating prevalence of rickets
- Healthy Start vitamins available freely to those qualifying for the Healthy Start scheme  
[www.healthystartnhs.uk](http://www.healthystartnhs.uk)

# Healthy Start vitamins

- Vitamin D drops for infants & children
- Vits A, C, D, with 7.5 ug vit D
- Free of charge up to 4<sup>th</sup> birthday
- Supplements for women who are pregnant or BF – vits C, D & folic acid, with 10ug vit D

# Conclusion

- Max bone health in childhood & adolescence is critical for future bone health
- Vit D plays a key role
- Previously thought that sunlight was adequate
- Little focus on diet
- Reflected by absence of vit D DRVs in UK
- BUT prevalence of vit D deficiency & rickets increasing in the UK

# Conclusion

- Mild – moderate vit D insufficiency produces lower bone mass in children & adolescents
- Increases risk of osteoporosis in later life
- Highlights importance of setting DRVs for all age groups in UK
- Need to increase dietary vit D sources through fortification of foods
- Need to highlight the importance of vit D supplementation

# Conclusion

- Emphasis on exclusive BF for 1<sup>st</sup> 6 months
- Low levels of vit D in breast milk
- Imperative that pregnant & BF women are made aware of poss deficiencies, impact & actions to take
- NICE 2008 Antenatal Guidelines
- Highlights diet in pregnancy, vit d & Healthy Start vits

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