

Parliamentary Briefing



Vitamin D Sunlight, Diet, Supplements Who gets enough?

Recommended intakes:

UK Department of Health recommendations for intake of vitamin D are¹:

Infants and children from 6 months – 5 years: 7 micrograms/day

Pregnant and breastfeeding women, people who are not exposed to sunlight and the elderly (over 65): 10 micrograms/day

DH recommends that these groups take food supplements to ensure sufficient vitamin D.

The European Union has set a Recommended Daily Allowance (RDA) of 5 micrograms for food labelling purposes²



1. http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_127421.pdf (accessed 11 October 2011)

2. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008L0100:EN:NOT> (accessed 11 October 2011)



Sunlight:

Vitamin D is synthesised by a biochemical reaction that takes place when skin is exposed to sunlight. 6 days of casual sunlight exposure on lighter skins can produce sufficient vitamin D to compensate for 49 days of no exposure³ (this must be without sunscreen)

Anywhere north of latitude 52° 12' (Cambridge in the UK) the sun only has sufficient strength to stimulate vitamin D synthesis from sunlight for 4 months of the year (mid May – mid September)⁴.

South of latitude 52° 12', the sun has sufficient strength to stimulate this reaction for 5 months of the year (May to September)

Because darker skin has evolved to deal with strong sunlight, in the UK individuals with African or Asiatic origins require a longer exposure to sunlight to synthesise adequate levels of vitamin D, therefore these populations are more at risk of deficiency⁵.

Light skin:

10-12 minutes of July sun = sufficient vitamin D for 49 days of no exposure

Asian skin:

30 minutes of July sun = sufficient vitamin D for 49 days of no exposure

African / Afro-Caribbean skin:

120 minutes of July sun = sufficient vitamin D for 49 days of no exposure

Exposure to sunlight breaks down surplus vitamin D to prevent excess being formed by sun exposure⁶.

3. Duplessis CA, Harris EB, Watenpaugh DE, Horn WG. Vitamin D supplementation in underway submariners. [Aviat Space Environ Med 2005;76:569-75](#). (accessed 11 October 2011)

4. Holick, M. F., McCollum Award Lecture, 1994: *Vitamin D – new horizons for the 21st Century*. *Am J Clin Nutr*, 1994;60: p619-30. 39. *Nutrition and Bone*

5. Harris, S. and B. Dawson-Hughes, *Seasonal changes in plasma 25-hydroxyvitamin D concentrations of young American black and white women*. *American J Clinical Nutrition*, 1998. 67: p1232-1236.

6. Holick MF. Sunlight and vitamin D: both good for cardiovascular health. [J Gen Intern Med 2002;17:733-5](#). (accessed 11 October 2011)



Safe daily intake levels⁷

EFSA (2006) children	25 micrograms
EFSA (2006) age 12-70	50 micrograms

Vitamin D levels found in foods:

Vitamin D is a fat soluble vitamin and the policy of advocating consumption of low fat foods has had a detrimental effect on vitamin D intakes.

Consumption of oily fish and organ meats have fallen substantially in the last few decades due to a number of factors; cost, changing public tastes, concerns about pollutants, fish stocks and farmed fish.

Egg consumption has fallen since the 1980's as a result of concerns about salmonella in chicken flocks and advice regarding cholesterol consumption. The cholesterol concern has since proved to be in error, however despite a campaign to amend the perception, the public has not moved back to the level of egg consumption that was seen even 20 years ago.

Half pint full fat milk	0.1 micrograms
Half pint semi skimmed milk	0.03 micrograms
Half pint skimmed milk	0 micrograms
150g whole milk yoghurt	0.06 micrograms
150g low fat yoghurt	0.01 micrograms
1 egg	1 micrograms
85g Salmon or mackerel	10 micrograms
85g liver	1.25 micrograms ⁸

7. Opinion of the Scientific Committee on Food on the Tolerable Upper Intake Level of Vitamin D; December 2002
http://ec.europa.eu/food/fs/sc/scf/out157_en.pdf (accessed 11 October 2011)

8. Office of Dietary Supplements; National Institutes of Health; Dietary Supplements Fact Sheet: Vitamin D
<http://ods.od.nih.gov/factsheets/vitamind> (accessed 11 October 2011)



Actual intakes in the UK:

The most recent report of the National Diet and Nutrition Survey shows dietary intake levels for vitamin D has declined and the majority of these at-risk groups do not achieve their recommended intakes⁹:

1997 mean intake (micrograms) 4-10 male & female	2010-11 mean intake (micrograms) 4-10 male & female	1997 mean intake (micrograms) 65+ male & female	2010-11 mean intake (micrograms) 65+ male & female
2.1	1.9	3.4	3.3
1997 upper 2.5% (micrograms) 4-10 male & female	2010-11 upper 2.5% (micrograms) 4-10 male & female	1997 upper 2.5% (micrograms) 65+ male & female	2010-11 upper 2.5% (micrograms) 65+ male & female
4.8	4.1	10.7	9.0

9. Department of Health National Diet & Nutrition Survey 2010-2011

http://www.dh.gov.uk/en/PublicationsandStatistics/Publications/PublicationsStatistics/DH_128166 (accessed 11 October 2011)



NICE guidelines: Maternal & child nutrition¹⁰:

Who should take vitamin D supplements?

- Pregnant and lactating women, children under 4 years

Who should take responsibility for ensuring these cohorts take vitamin D supplements?

- Primary Care Trust commissioners & managers; GPs, midwives, health visitors, obstetricians, paediatricians, community pharmacists, dieticians, public health nutritionists.

What action should be taken?

- Education of health professionals about the importance of vitamin D supplements
- Information to pregnant and breastfeeding women and parents of children under 4
- Health professionals to check that women and children at highest risk of deficiency (South Asian, African, Caribbean, Middle Eastern descent, obese, limited exposure to sunlight) are aware of, and following advice.

There is little evidence that these guidelines are being followed

10. Improving the nutrition of pregnant and breastfeeding mothers and children in low-income households; National Institute of Clinical Excellence, July 2011 <http://www.nice.org.uk/nicemedia/live/11943/40097/40097.pdf> (accessed 11 October 2011)



NICE guidelines: The elderly¹¹:

The drugs used to treat osteoporosis require adequate levels of vitamin D to be effective; the studies examined by NICE used vitamin D supplementation to ensure this. NICE guidelines for the treatment of osteoporosis make the assumption that patients are vitamin D replete – this is often not the case (see Actual Intakes table above).

The NHS are required, by law, to provide funding and resources for recommendations made by NICE within 3 months of guidance publication. NICE guidelines make no clear recommendations for dose, or route of administration, for vitamin D supplementation.

Guidelines for the prevention and treatment of osteoporosis do not lay out target population; responsible health practitioners; or action to take, in the way this is set out for maternal and child nutrition. The following should be incorporated in the guidelines:

Who should take vitamin D supplements?

- All people over 65, with an emphasis on the institutionalised.

Who should take responsibility for ensuring these cohorts take vitamin D supplements?

- Dieticians, public health nutritionist, GPs, consultant geriatricians, community pharmacists

What action should be taken?

- DH to acknowledge and publicise the vitamin D issue in the development and management of osteoporosis
- NHS to make available information on appropriate products for self-care and prescription medication
- DH to send information to ALL healthcare professionals dealing with geriatrics (GPs, practice nurses, district nurses, rheumatologists, orthopaedic surgeons, geriatricians, care homes, hospitals with geriatric wards etc) on the vitamin D issue
- Responsible healthcare professionals should take note of existing guidance and act upon it
- Responsible healthcare professionals should take preventative action, advising all individuals over 65 to take a prophylactic food supplement of 10micrograms vitamin D a day
- Where osteoporosis is detected, supplementation with vitamin D (and possibly calcium) should automatically accompany any drug regimen

11. Alendronate, etidronate, risedronate, raloxifene and strontium ranelate for the primary prevention of osteoporotic fragility fractures in postmenopausal women (amended); National Institute of Clinical Excellence January 2011
<http://www.nice.org.uk/nicemedia/live/11746/47176/47176.pdf> (accessed 11 October 2011)



Cost implications: Rickets

Prompt treatment of rickets with vitamin D supplementation is effective. If the disease is not advanced oral supplementation is effective, if the disease requires higher more intensive vitamin D, injections will be required¹².

The cost of a year's supply of prescribed vitamin D as 10 micrograms of colecalciferol in combination with calcium can be as low as £25¹³. The purchase of a year's supply of a commonly available food supplement from a high street chain can cost as little as £13.00

If the disease remains untreated surgery may be required with all the attendant costs entailed in hospitalisation and recovery time.

12. Patient.co.uk <http://www.patient.co.uk/health/Rickets.htm> (accessed 11 October 2011)

13. British National Formulary online http://bnf.org/bnf/bnf/current/66778.htm#_66778 (accessed 11 October 2011)



Cost implications: Osteoporosis

There are 89,000 hospital admissions for hip fractures each year in the UK; this is anticipated to rise to 140,000 a year by 2036.

In 2000 the cost of a hip fracture patient spending a year in long term residential care was estimated to be £25,524.

The combined annual cost of hospital and social care for patients with a hip fracture in the UK was calculated in 2001 to be £1.7 billion. The National Osteoporosis Society now estimate this to be £2.3 billion a year, a cost of more than £6 million a day¹⁴.

Approximately 5% of falls result in bone fracture; 90 % of hip fractures in the elderly are caused by falls¹⁵. A Cochrane review in 2010 found a 28% reduction in the incidence of falls where vitamin D supplementation was used¹⁶.

The European Food Safety Authority has recently given a favorable opinion on a health claim for vitamin D: *"Vitamin D may reduce the risk of falling. Falling is a risk factor for bone fractures"*.¹⁷

Reducing falls by 28% could result in 24,920 fewer hip fractures a year.

This would be a saving of £636,058,080 to the NHS

In January 2010 there were 11.8 million people over 65 in the UK.

At £25 per year for vitamin D supplementation, a policy to provide vitamin D supplementation to the entire population of over 65's in the UK would be **£ 295,000,000**.

Preventing 11,558 hip fractures a year would pay for this

14. A Fragile Future: 25th Anniversary Report of the National Osteoporosis Society; June 2011

<http://www.nos.org.uk/document.doc?id=904> (accessed 11 October 2011)

15. International Osteoporosis Foundation; facts and statistics about osteoporosis and its impact; Risk Factors

<http://www.iofbonehealth.org/facts-and-statistics.html#factsheet-category-22> (accessed 11 October 2011)

16. Cameron ID, Murray GR, Gillespie LD, Robertson MC, Hill KD, Cumming RG, Kerse N: Interventions for preventing falls in older people in nursing care facilities and hospitals The Cochrane Collaboration 2010 <http://www2.cochrane.org/reviews/en/ab005465.html> (abstract accessed 11 October 2011)

17. <http://www.efsa.europa.eu/en/efsajournal/pub/2382.htm> (accessed 11 October 2011)