Scientific Advisory Committee on Nutrition
For the attention of the Secretariat
Department of Health
135-155 Waterloo Road
London SE1 8UG

Date: April 28, 2011
Ref: 2011042810RG

By email to: sacn@dh.gsi.gov.uk

Dear SACN,

Call for evidence – SACN review of Vitamin D

Attached are my personal comments on your proposed review.

Based on evidence from research quoted in this document, I suggest that you consider that the following new target levels should be established:

Vitamin D deficiency	< 100 nmol/L
Normal levels	100-200 nmol/L
Normal levels for pregnant women	120-200 nmol/L

Based on my review of the evidence about biomarkers of Vitamin D sufficiency I consider that any of the trials that you evaluate that do not measure or achieve levels above 100 nmol/L should be considered a "Null Trial" and should be disregarded.

I will be pleased to provide SACN with copies of the evidence quoted in this submissions

Yours sincerely

Rufus Greenbaum

Biomarkers of Vitamin D Sufficiency

May I suggest that "Biomarkers of Vitamin D Sufficiency" are one of the most critical items that should be established as early as possible in the review.

There is evidence from evaluation of biomarkers that levels of 25-hydroxyvitamin D (25(OH)D) below 100 nmol/L should be considered as "deficient".

In 2005, the journal of the American Society for Nutritional Sciences published the paper:

> **Circulating 25-Hydroxyvitamin D Levels Indicative of Vitamin D Sufficiency: Implications for Establishing a New Effective Dietary Intake Recommendation for Vitamin D**

In it, Dr Bruce Hollis suggests that there are 3 biomarkers that should be considered:

- Parathyroid Hormone (PTH)
- Calcium Absorption
- Bone Mineral Density (BMD)

He states: "..I strongly believe that nutritional vitamin D deficiency should be defined as <80 nmol/L circulating 25 (OH)D"

In 2003 the British Journal of Nutrition published the paper:

> **Vitamin D in preventive medicine – are we ignoring the evidence ?**

In it, Professor Armin Zittermann quotes: "Serum 25(OH)D levels between 50-100 nmol/L can be regarded as hypovitaminosis D, where body stores are already depleted and PTH levels can be slightly elevated but are still in the normal range."

These 2 papers, and other later studies, should be carefully reviewed and the effects on 25(OH)D on these biomarkers should be assessed.

My reading of these 2 papers is that below 100 nmol/L:

- the body uses up stores of Vitamin D
- muscle strength is reduced
- Bone Mineral Density is reduced by withdrawal of Calcium from the bones.

In my calculations I have assumed that the target limit of 25(OH)D should be set greater than 100 nmol/L

Vitamin D levels in the UK

The actual levels of 25(OH)D in the general population in the UK should be assessed

In 2007 the journal of the American Society for Nutrition published a study by Dr Elina Hypponen & Chris Power of 7,437 people in the UK aged 45 in 2003

> **Hypovitaminosis D in British adults at age 45 y:**
> **nationwide cohort study of dietary and lifestyle predictors.**

Figure 1 shows that the average 25(OH)D varied between 35 nmol/L in February and 75 nmol/L in September.

They showed significant seasonal and geographical variation. It was predominantly a study of the then current white population. *It can be assumed that people with darker skin will have significantly lower results.*

It should be assumed that the results will be significantly different between

- the south of England and the north of Scotland
- people of different skin colour
- those who choose to cover up their skin with clothing
- those who use sun-screen

In private communication I have received data giving a summary of all the recent tests done at 2 UK hospitals. Further clarification is required regarding the tests and the time of year:

Hospital	**Patients**	**Sufficient (>100 nmol/L**
Blackburn	1,000	<5%
Ealing	5,000	<5%

Reviews should be made of the latest nationwide data and possible additional studies commissioned.

In my later calculations I have assumed:

> **UK Winter average 25 (OH)D = 35 nmol/L**
> **UK Summer average 25(OH)D = 75 nmol/L**

25-Hydroxyvitamin D and Health Outcomes-1

Dr Peter Lewis has suggested that: "Lack of sunlight may be implicated in over 60 illnesses." He gives his patients a 4-page booklet:

Vitamin D - The Sunshine Superhormone (www.vitamindassociation.org)

In www.vitamindwiki.com and www.vitamindcouncil.org there are reviews of the evidence. The commentary suggests that the evidence is:

Strong

Cancers of prostate, breast, bladder, skin
Osteoporosis, Rickets, Multiple Sclerosis
Fall & fractures in the elderly

Associated

Diabetes, influenza, colds, kidney disease
Birth problems, Seasonal Affective Disorder, pancreas disease
Overweight, Heart disease
Lupus, Chronic pain, Amyotrophic lateral sclerosis
Tuberculosis, Irritable Bowel Disease, Chronic obstructive pulmonary disease
All cancers, Psoriasis
Bone density & fractures

Suspected

Autism, Gum disease, Allergies, AIDS
Asthma, headaches, rosacea
Battered children, Cystic fibrosis

In January 2010 the BMJ published a paper by Dr Simon Pearce & Dr Tim Cheetham:

Diagnosis and management of Vitamin D deficiency

There were similar articles in the BMJ in 2005 (Dr G Venning) and 1998 (Dr J Compston). All of these articles were followed by online Rapid Responses from correspondents making informed comments and suggesting that ***"something should be done"***

In 2006 the American Society for Nutrition published a paper by Dr Heike Bischoff-Ferrari et al:

Estimation of optimal serum concentrations of 25-hydroxyvitamin D for multiple health outcomes

Lower Extremity Functions:

- "8-foot walk time" showed major improvements above 60 nmol/L
- "Sit-to-stand time" showed major improvements above 40 nmol/L, (with continued minor improvements up to 120 nmol/L)

Periodontal Disease

- Improvements were seen as 25(OH)D increased from 71-112 nmol/L
- Dental "Attachment Loss" was reduced when 25(OH)D was between 90-100 nmol/L

Colorectal Cancer

- Studies showed an inverse relationship between 25(OH)D and colorectal cancer

25-Hydroxyvitamin D and Health Outcomes-2

In 2009 the Annals of Epidemiology published a paper by Professor Cedric Garland et al

Vitamin D for Cancer Prevention: Global Perspective

All Cancers
A Randomized Control Trial by Dr Joan Lappe et al showed a 77% reduction in all cases of Cancer, when 27.5 micrograms (1,100 IU) of Vitamin D & 1,450 mg of Calcium were taken each day (Cancers in the first year were excluded)

Breast Cancer
Women in the highest quintile (>95 nmol/L) had 58% lower risk of Breast Cancer compared to women in the lowest quintile (<37.5 nmol/L)
Extrapolation of the data suggests that the risk may be reduced by 90% at >150 nmol/L

Colorectal Cancer
People in the highest quintile (>95 nmol/L) had a 55% lower risk of Colorectal Cancer compared to those in the lowest quintile (<40 nmol/L)
Extrapolation of the data suggests that the risk may be reduced by 90% at >150 nmol/L

Prostate Cancer
Physicians whose 25(OH)D was below the median level (70 nmol/L) had twice the aggressive prostate cancer compared to men whose levels were above the median

In this paper, Professor Cedric Garland et al propose a new model of cancer pathogenisis that they call DINOMIT.

Treatment of low 25-hydroxyvitamin D

In 2003 the American Journal of Clinical Nutrition published a paper by Dr Robert Heaney et al:

> **Human serum 25-hydroxycholecalciferol response to extended oral dosing with cholecalciferol**

From a mean baseline value of 70.3 nmol/L, equilibrium concentrations of serum 25-hydroxycholecalciferol changed during the winter months in direct proportion to the dose, with a slope of 0.70 nmol/L for each additional 1 microgram of cholecalciferol input. Cholecalciferol was administered daily in controlled oral doses labelled at 0, 25, 125, and 250 micrograms cholecalciferol for about 20 weeks during the winter, to 67 men living in Omaha, Nebraska (=41.2° N latitude, approximately equivalent to Boston or southern Italy).

Using this result, the amount of Cholecalciferol required to raise the 25(OH)D levels of the average UK person to the lower limit of 100 nmol/L would be:

Season	Base level	Dose (micrograms)	Dose (IU)
Winter	35 nmol/L	92.9 micrograms/day	3,716 IU/day
Summer	75 nmol/L	35.7 micrograms/day	1,428 IU/day

This leads to a rough approximation:

Season	Dose (micrograms)	Dose (IU)
Winter	100 micrograms/day	4,000 IU/day
Summer	50 micrograms/day	2,000 IU/day

Obese people should increase the dose. Dr James Dowd, in his book **The Vitamin D Cure**, proposes 20-25 IU per pound of body weight (Chapter 5). Dr Robert Heaney proposes a total requirement of Vitamin D3 from all sources (sun+food+supplements etc.) of 75 IU per kilogram of body weight.

People who do not expose their bodies to the sun at any time, because they cover their skin with clothes or use lots of sunscreen, or people who have very dark skins should take the full winter dose all year long.

Without a large initial loading dose, it takes 90-120 days for the blood serum level to stabilise

At www.grassrootshealth.net there is a large world-wide study where the response to known doses of Vitamin D3 is being reported. From more than 3,500 contributions there is a 10:1 variation in the dose-response, which merits further investigation.

Current Trials

The data from Page 6 suggest that 10 micrograms (400 IU) of Vitamin D3 raises 25(OH)D by approximately 7 nmol/L

As a result, an average adult taking the current UK Department of Health recommended amount of 10 micrograms/day would achieve:

Season	Base level	Dose (micrograms)	Result
Winter	35 nmol/L	10 micrograms/day	42 nmol/L
Summer	75 nmol/L	10 micrograms/day	82 nmol/L

If the average adult took the current recommended amounts of Vitamin D3 they would not reach the lower limit of 100 nmol/L at any time in the year

As a result, any trial where an average weight adult is taking less than 50 micrograms/day (2,000 IU) in the summer and less than 100 micrograms/day (4,000 IU) in the winter will achieve less than optimum blood serum levels.

The results of any of trials that do not supplement with these amounts or achieve blood serum levels of >100 nmol/L should be judged accordingly or dis-regarded.