An aerial photograph of a university campus, likely Queen's University Belfast, showing a mix of modern and traditional buildings, green spaces, and a river. The text is overlaid on the right side of the image.

# **Influences of Diet and Exercise on Bone Health in Athletes:**

**Dairy Council for Northern Ireland  
'Milk It' Performance Nutrition Seminar**

**W5, Odyssey, Belfast,  
Tues 21<sup>st</sup> November 2017**

---

Professor Susan Lanham-New FAFN, FRSB  
Head of Department of Nutritional Sciences

# What is a Healthy Diet?

---



THE TIMES  
THE SUNDAY TIMES  
**GOOD  
UNIVERSITY  
GUIDE  
2016**  
UNIVERSITY  
OF THE  
YEAR

# Eatwell Guide

Check the label on packaged foods

Each serving (150g) contains

|                             |             |                   |               |              |
|-----------------------------|-------------|-------------------|---------------|--------------|
| Energy<br>1046kJ<br>250kcal | Fat<br>3.0g | Saturates<br>1.3g | Sugars<br>34g | Salt<br>0.9g |
| 13%                         | LOW         | LOW               | HIGH          | MED          |
|                             | 4%          | 7%                | 38%           | 15%          |

of an adult's reference intake  
Typical values (as sold) per 100g: 697kJ/ 167kcal

Choose foods lower in fat, salt and sugars

Use the Eatwell Guide to help you get a balance of healthier and more sustainable food. It shows how much of what you eat overall should come from each food group.



Water, lower fat milk, sugar-free drinks including tea and coffee all count.

Limit fruit juice and/or smoothies to a total of 150ml a day.



Eat less often and in small amounts

Per day  2000kcal  2500kcal = ALL FOOD + ALL DRINKS

iPlayer Radio) Search Stations Categories Schedules My Radio

**BBC RADIO 4** **TODAY** On Now: The World Tonight  
LISTEN 11/05/2017  
Weekdays 6-9am and Saturdays 7-9am

Home Episodes Highlights Podcasts Thought For The Day Presenters About Contact Us



**Last on**  
BBC RADIO 4 Wed 12 Apr 2017  
**06:00**  
BBC RADIO 4

**More episodes**

PREVIOUS  
11/04/2017

NEXT  
13/04/2017

See all episodes from Today

Listen now  
12/04/2017

iPlayer Radio) Search Stations Categories Schedules My Radio

**BBC RADIO 2** **Jeremy Vine** On Now: The Radio 2 Arts Show with...  
LISTEN 11/05/2017

Home Episodes Clips Podcast Vine in 1914 My Favourite Painting What Makes Us Human More



**Last on**  
BBC RADIO 2 Wed 12 Apr 2017  
**12:00**  
BBC RADIO 2

**More episodes**

PREVIOUS  
United Airlines and Winchester College

NEXT  
Railway Trespass and

Listen now

**Beware of cutting out specific food groups**



# NEWS

[Home](#)[UK](#)[World](#)[Business](#)[Politics](#)[Tech](#)[Science](#)[Health](#)[Education](#)[Entertainment](#)

## Health

# Dairy-free diets warning over risk to bone health

🕒 12 April 2017 | [Health](#)



 Share

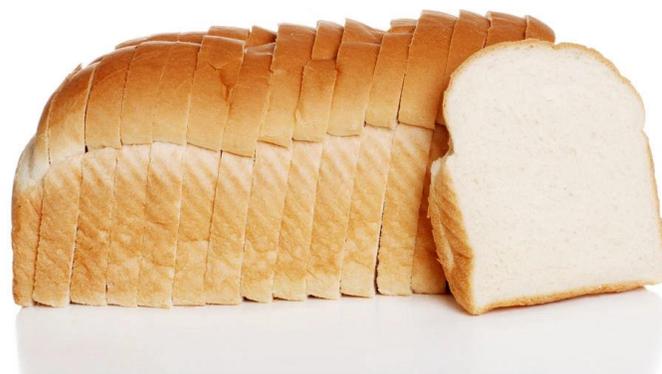
Prof Susan Lanham-New, head of nutritional sciences at the University of Surrey and clinical advisor to the National Osteoporosis Society, said: "Diet in early adulthood is so important because by the time we get into our late 20s it is too late to reverse the damage caused by poor diet and nutrient deficiencies and the opportunity to build strong bones has passed."

# Vegan sources of Calcium

You **can** achieve a calcium rich diet on a vegan or vegetarian diet



**Dairy alternatives e.g. milk, yoghurts and puddings**



**Fortified white bread**



**Firm tofu**



**Dark green leafy vegetables e.g. Kale, broccoli, Brussel sprouts and watercress**



**Fortified orange juice**



**Fortified breakfast cereals**

# Veganism and Bone Health

Knurick *et al* 2015

Young, non-obese adults consuming meat-based (n = 27), lacto-ovo vegetarian (n = 27), or vegan (n = 28) diets for  $\geq 1$  year

24-hour diet recall, whole body DXA scan, 24-hour urine specimen, and fasting blood samples collected

BMD was non-significantly lower in non-meat eaters in comparison to omnivores. Protein intake was reduced  $\sim 30\%$  in individuals consuming lacto-ovo and vegan diets as compared to those consuming meat-based diets ( $68 \pm 24$ ,  $69 \pm 29$ , and  $97 \pm 47$  g/day respectively,  $p = 0.006$ )

Urinary pH was more alkaline in the lacto-ovo and vegan groups versus omnivores ( $6.5 \pm 0.4$ ,  $6.7 \pm 0.4$ , and  $6.2 \pm 0.4$  respectively,  $p = 0.003$ ), while calcium excretion was significantly higher in omnivores compared to vegetarians ( $p = 0.045$ )

Data suggest that plant-based diets are not detrimental to bone in young adults

| Age (yrs)        | RNI (mg/d)  |
|------------------|-------------|
| Infants/children |             |
| 0-1              | 525         |
| 1-3              | 350         |
| 4-6              | 450         |
| 7-10             | 550         |
| Males            |             |
| 11-14            | 1000        |
| 15-18            | 1000        |
| 19-50            | 700         |
| 50+              | 700         |
| Females          |             |
| 11-14            | 800         |
| 15-18            | 800         |
| 19-50            | 700         |
| 50+              | 700         |
| Pregnancy        | No increase |
| Lactation        | +550        |

## Reference Nutrient Intakes for Calcium in the UK

Lower RNI -  
400mg/d  
(COMA, 1998)

US RDA (15-18yrs)  
1200mg/d

Australia/NZ (16-18yr)  
1800mg/d

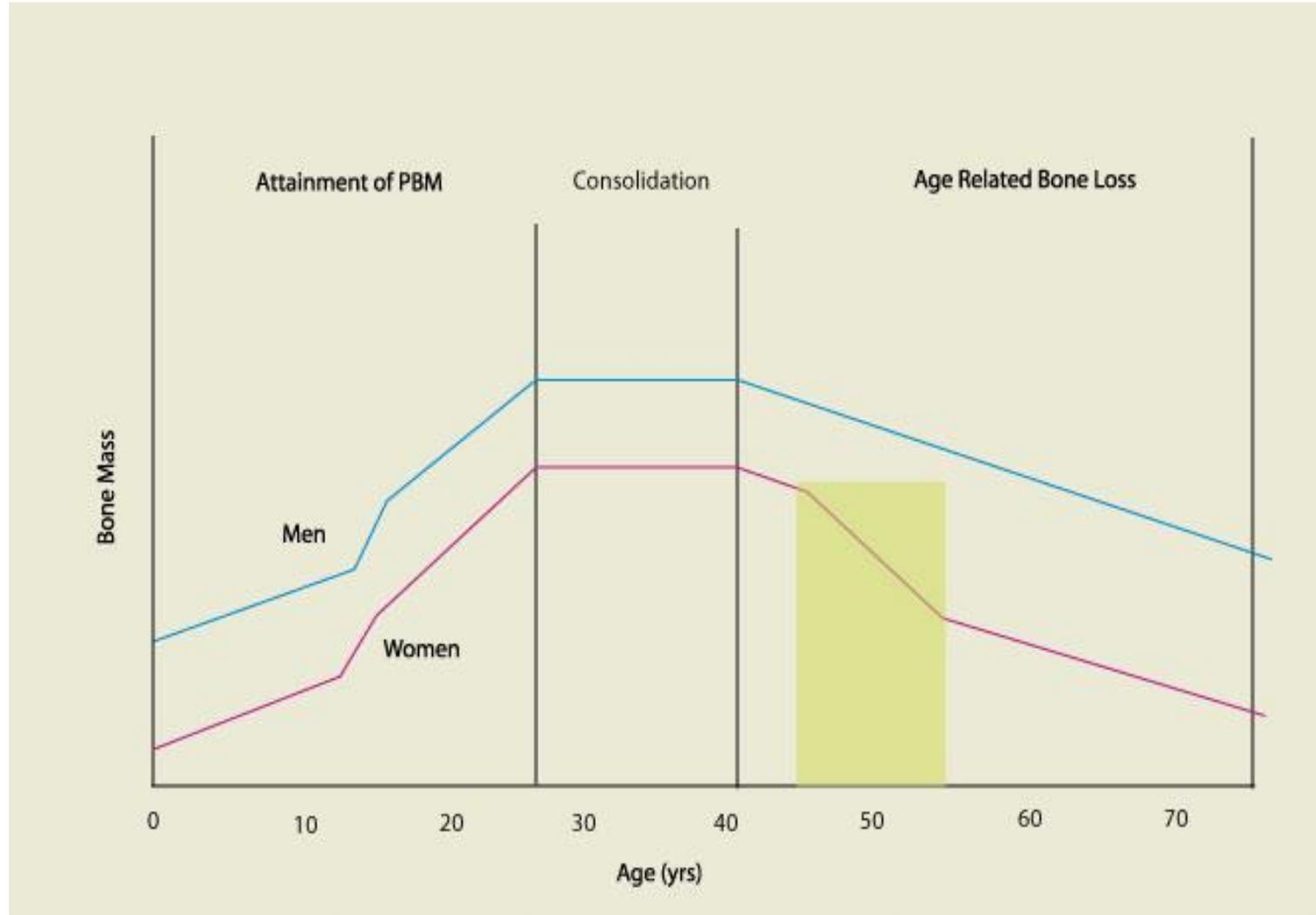
# Sources of Dietary calcium

| Food source             | Average Portion size | Calcium (mg) |
|-------------------------|----------------------|--------------|
| Milk, whole             | Glass, 200 ml        | 236          |
| Milk, skimmed           | Glass, 200 ml        | 244          |
| Yoghurt, low-fat, plain | Pot, 150g            | 243          |
| Cheese, cheddar         | Medium chunk, 40g    | 296          |
| Sardines, tinned        | Portion, 100g        | 500          |
| Curly kale              | Serving, 95g         | 143          |
| Red kidney beans        | 3tbsp, 105g          | 75           |
| Sesame seeds            | 1tbsp, 12g           | 80           |
| Almonds                 | 12 whole, 26g        | 62           |
| Apricots                | 4 fruit, 160g        | 117          |
| Pasta                   | Portion, 230g        | 85           |
| White bread             | Slice, 30g           | 32           |

# Dietary Calcium and Bone Health



# Changes in bone mass during the life-cycle



# Bone mass

All skeletal calcium acquired from diet

Bone mineralisation cannot occur without presence of calcium in excess of that required for homeostasis

Measurement of bone mass is an indicator of calcium status and bone health

Bone mineral density (BMD) can be measured by eg: DXA (dual-energy x-ray absorptiometry)

## Calcium studies – RCT's in children and adolescents

Johnson et al 1992

– 3yr age 6-14yrs 1000mg Ca/d inc BMD

Lloyd et al 1993

– 18mo age 11.9yr 500mg/d inc BMD  
inc BMC

Nowson et al 1997

– 2yr 10-17yr 1200mg/d inc BMD  
(postmenarcheal girls only)

Bonjour et al 1997

– 1yr 6-9yr 850mg/d inc BMD

Cadogan et al 1997

– 18mo 11yr 1pt milk inc BMD  
inc BMC

# Calcium supplementation in post-menopausal women

Meta-analysis (Tang et al, Lancet 2007) of 29 RCT's

- Ca with or without vitamin D effective in preventing bone loss and fracture
- Risk reduction greatest in
  - Elderly
  - Institutionalised
  - Low body weight
  - Low-Ca diet
  - Higher baseline risk

## Calcium acting as a threshold nutrient?

- Below threshold, bone mass is function of intake
- Above it, increased Ca intake has no further effect?

Should supplementation be targeted at those with low intakes?

# Importance of Physical Activity to Bone Health

## **Wolff – 1869**

“Bone accommodates the forces applied to it by altering its amount and distribution of mass”

## **Frost - 1987**

Concept refined to a general theory of bone mass regulation

# Impact of Exercise on Bone Health -1

| Age Group       | Author                | Publication               | Effect (+ve) |
|-----------------|-----------------------|---------------------------|--------------|
| Children        | Slemenda <i>et al</i> | JBMR<br>1992;7:93         | √            |
| Young Women     | Recker <i>et al</i>   | JAMA<br>1992;17:2403-2408 | √            |
| Pre menopausal  | Jonsson <i>et al</i>  | Bone<br>1992;13:191-195   | √            |
| Post Menopausal | Prince <i>et al</i>   | NEJM<br>1991;325:1189-195 | √            |
| Elderly         | Cooper <i>et al</i>   | BMJ<br>1988;297:1443-446  | √            |

**Physical activity & bone health throughout the lifecycle**  
**1. General Population**

# Impact of Exercise on Bone Health - 2

| Sport              | Author                 | Publication                      | Effect (+ve) |
|--------------------|------------------------|----------------------------------|--------------|
| Tennis Players     | Jones <i>et al</i>     | JBJS<br>1977;59A:204-208         | ✓            |
| Skaters            | Slemenda <i>et al</i>  | BM<br>1993;20:125-132            | ✓            |
| Rowers             | Wolman <i>et al</i>    | Ann Rheum Dis<br>1991;50:487-489 | ✓            |
| Power Athletes     | Bennell <i>et al</i>   | Bone<br>1997;20:477-484          | ✓            |
| Volleyball Players | Alfredson <i>et al</i> | CTI<br>1997;60:338-342           | ✓            |

**Physical activity & bone health throughout the lifecycle**  
**2. Specific Sports Groups**

# Man has the stomach, but not the legs, for Mars

THE FIRST person to walk on Mars would break a leg, research published today reveals.

Although there are still several technical problems to be solved before anyone visits the Red Planet, keeping space travellers fit enough during the

BY JEREMY LAURANCE  
Health Editor

voyage to take that first step could be one of the trickiest.

The trouble lies with the skeleton and its capacity to withstand a two to three-year journey in zero gravity. When bones are left unused – not bearing any weight – they leak calcium and weaken.

When the travellers to Mars

step out of the spacecraft, like stooped elderly women with osteoporosis, they will be at high risk of fractures. A study published in *The Lancet*, of 15 Russian cosmonauts on the space station Mir, found all had suffered bone loss from their legs. In those who spent longest in space – six months – the losses ranged up to 23 per cent.

One cosmonaut had bones that were similar to those of

paraplegics. Yet the one who had made the most space “walks” – and had spent longest in space – showed no bone loss at all.

The researchers from St Etienne University in France found the arms of the cosmonauts were unaffected – possibly because they had taken the role of the legs. In space, cosmonauts don’t walk – they pull themselves along.

The findings show in-flight exercises to keep the legs in peak condition do not work. And once the cosmonauts returned to Earth, their bones improved but were still significantly weaker six months later than before their mission.

Michael Holick, of Boston University, Massachusetts, says in *The Lancet* the problem could “substantially affect plans for long distance space travel”.



Sunday Times 15<sup>th</sup> January 2001

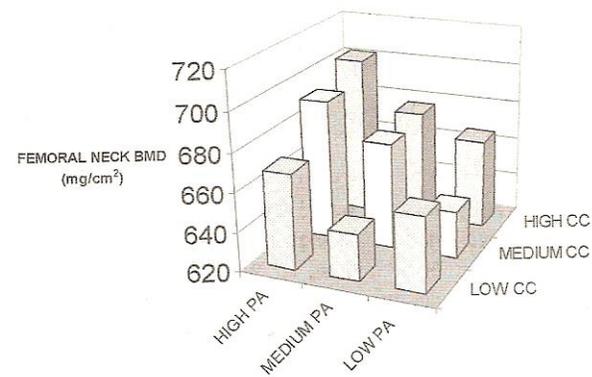
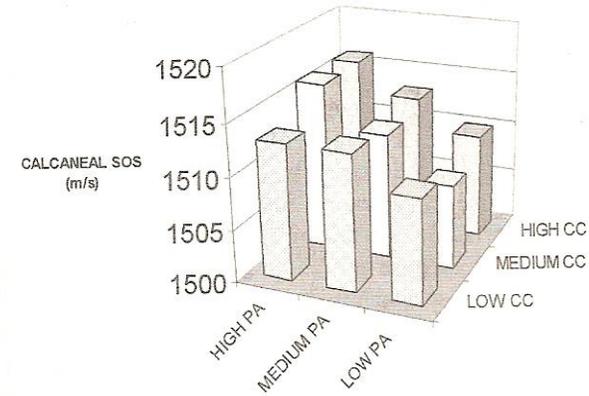
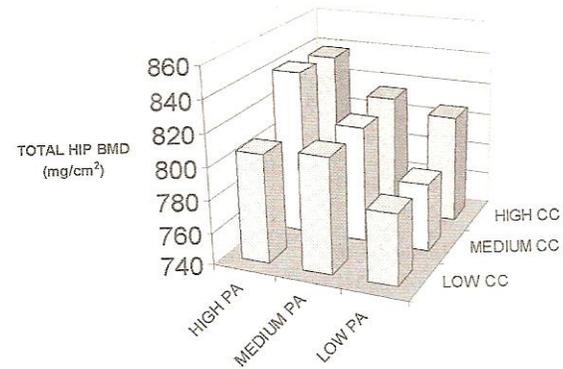
# Physical Inactivity = Bone Loss!

# Bone mass in calcium-replete postmenopausal women

- 2 year exercise intervention with calcium supplementation.
- Total of 126 POM women studied (mean age 60y)
- Strength (loading), fitness or non-exercise control
- 3 sets of the same 9 exercises, 3x week
- Strength group progressively increased their load throughout the study
- Significant effect of the strength program at the total (0.9 +/- 2.6%,  $P < 0.05$ ) and intertrochanter site (1.1 +/- 3.0%,  $P < 0.01$ )

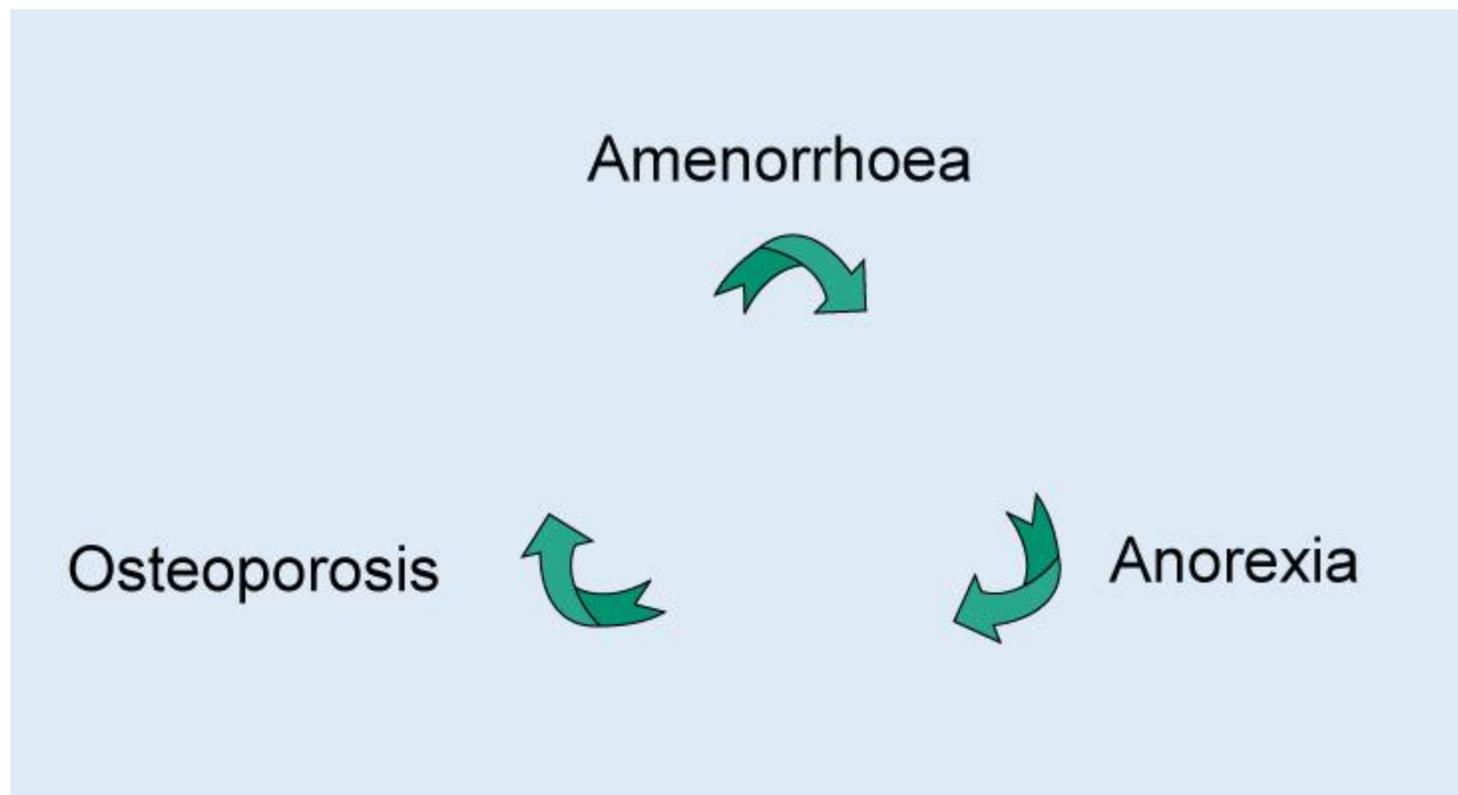
**Kerr et al. J Bone Miner Res 2001;16:175-181)**

# Physical activity and high calcium intake have an additive effect on bone health



**Kerr et al J Bone Miner Res 2001;16:175-181**

# Female Athletic Triad



**American College of Sports Medicine. Position stand on the female athletic triad. *Medicine & Science in Sport and Exercise* 1997;29:i-ix.**

Importance of  
Calcium  
and Vitamin D  
to athletes



National  
Osteoporosis  
Society

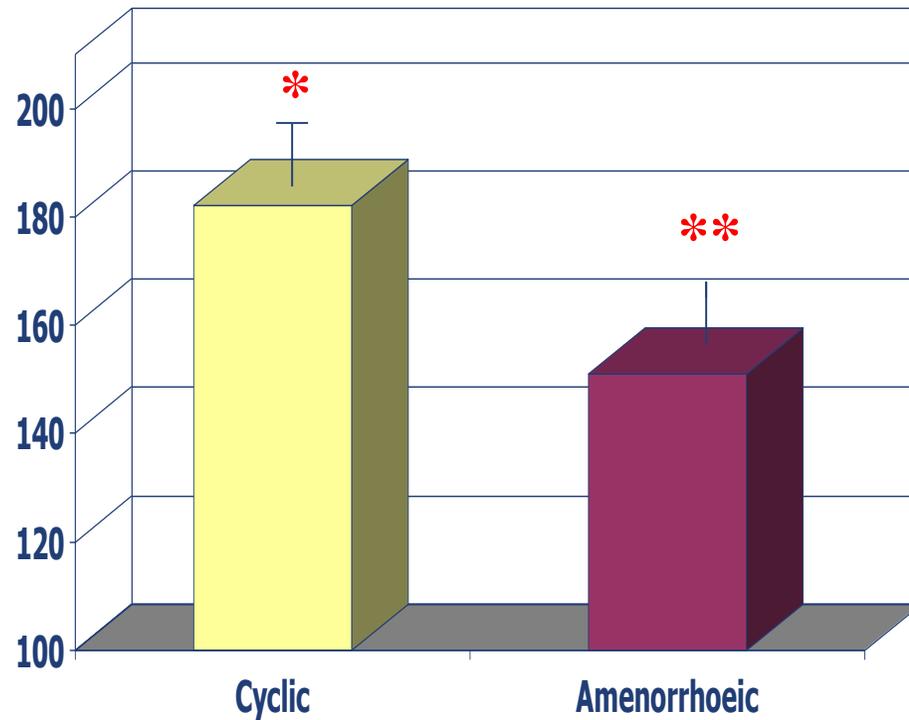
# Fit but Fragile

Advice on bone health for  
young women athletes and  
dancers, their coaches  
and teachers

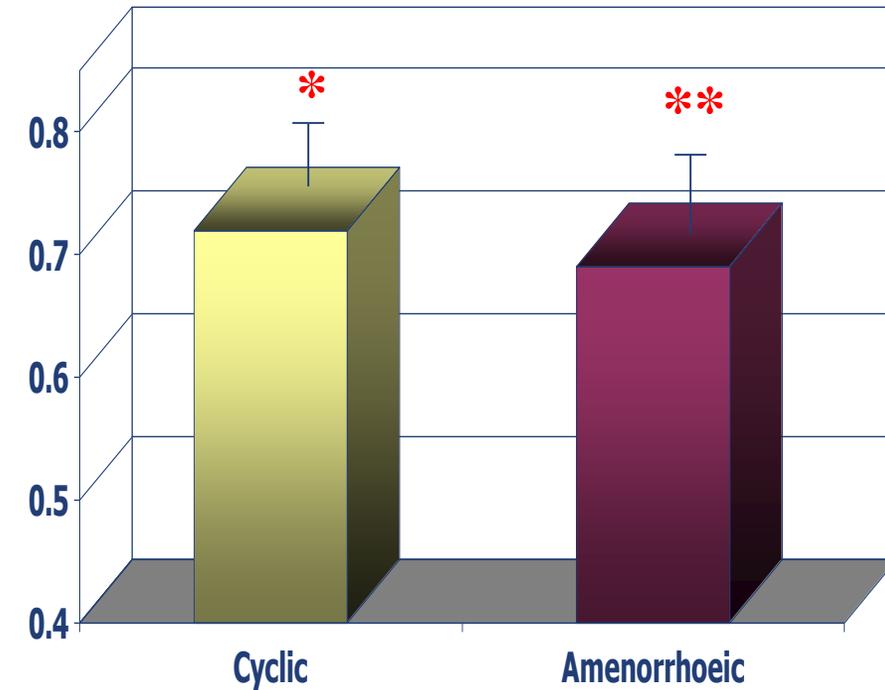
# IMPACT OF EXERCISE ON BONE HEALTH

## Detrimental Effects in Amenorrhoeic Athletes

Lumbar Spine ( $\text{g}/\text{cm}^3$ )

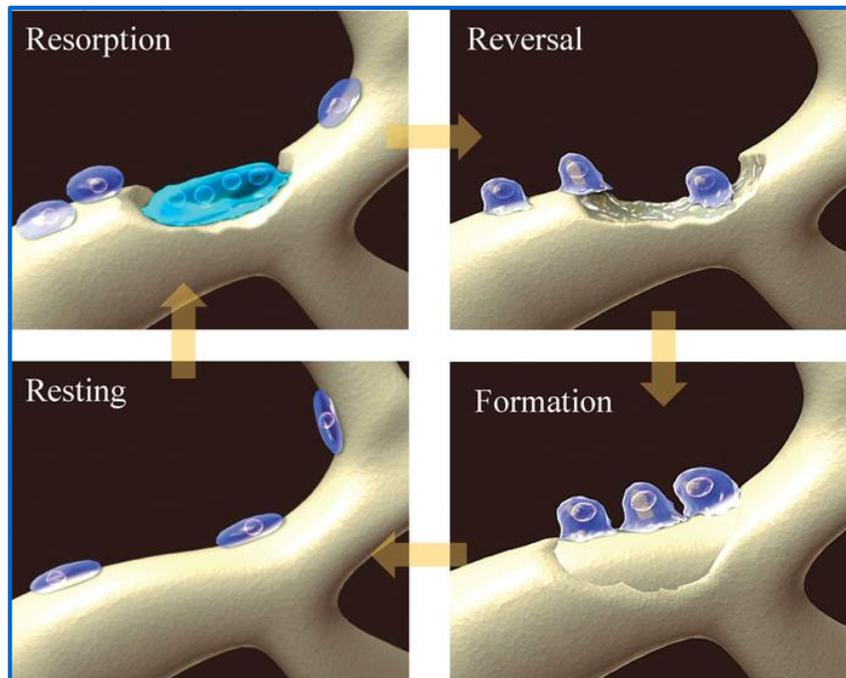


Radius ( $\text{g}/\text{cm}^3$ )



**Reference: Marcus R et al. Ann Int Med 1985;102:158-163.**

## Bone remodelling



## Resorption

- ***Osteoclasts*** break down bone creating a resorption cavity

## Formation

- ***Osteoblasts*** make new bone matrix which is then mineralised, filling the remodelling space

## Enables bone to

- adapt to mechanical loading
- repair damage



# RESULTS I - Descriptive data (mean, SD)

|   | <b>GYM</b><br>( <i>n</i> 43) | <b>CON</b><br>( <i>n</i> 52) | <b>P-value</b><br>(ANOVA) |
|---|------------------------------|------------------------------|---------------------------|
| <b>AGE</b> at baseline<br>(years)               | 11.3 [2.3]                   | 11.3 [1.9]                   | ns                        |
| <b>HT:</b> at baseline (m)<br>1-yr increase (%) | 1.36 [0.1]<br>3.9            | 1.48 [0.1]<br>3.4            | 0.001<br>ns               |
| <b>WT:</b> at baseline (m)<br>1-yr increase (%) | 31.7 [8.4]<br>12.6           | 41.0 [11.1]<br>11.3          | 0.001<br>ns               |
| <b>BODY fat</b> (%)                             | 6.8 [2.6]                    | 18.3 [8.4]                   | 0.001                     |
| <b>AGE</b> at menarche<br>(years)               | 14.1<br>[1.4] ( <i>n</i> 9)  | 12.7<br>[1.0] ( <i>n</i> 22) | 0.003                     |

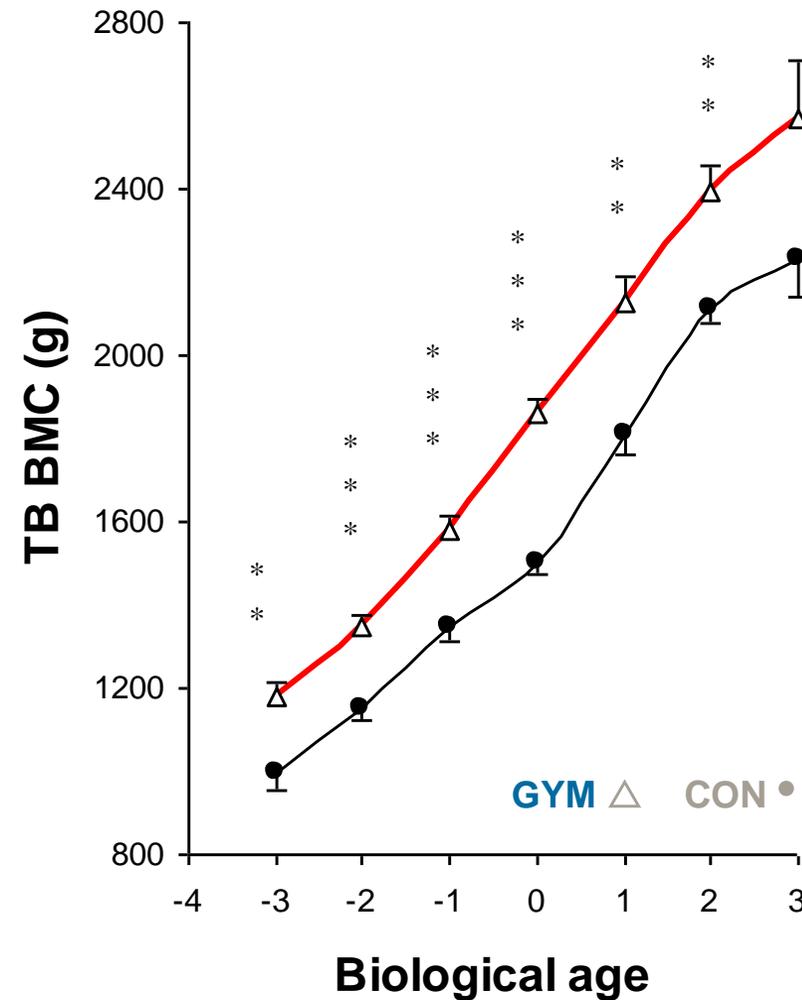
## Parental influence on bone growth in gymnasts and controls

|                                | <b>Gymnasts</b><br>( <i>n</i> 45) | <b>Controls</b><br>( <i>n</i> 52) | <b>P value</b> |
|--------------------------------|-----------------------------------|-----------------------------------|----------------|
| Birth Weight (g)               | 3100 [524]                        | 3358 [562]                        | 0.03           |
| Mother's Height (m)            | 1.59 [0.04]                       | 1.65 [0.06]                       | 0.001          |
| Father's Height (m)            | 1.76 [0.07]                       | 1.80 [0.06]                       | 0.007          |
| Target Height (m)              | 1.74 [0.04]                       | 1.79 [0.04]                       | 0.001          |
| Mother's Age of Menarche (Yrs) | 13.3 [0.9]                        | 12.7 [1.4]                        | 0.05           |

# RESULTS VI TB BMC by maturity (MEAN, SEM)

➤ Adjusted  
for ht, wt

\*\*  $p < 0.01$   
\*\*\*  $p < 0.001$



**Nurmi-Lawton et  
al. JBMR 2004;  
19: 314-322**

# Jumping improves hip and lumbar spine bone mass in children



**Investigation of high impact jumping on BMD.**

**89 boys and girls (6-9 yrs)**

**7 month exercise programme**

**During school week, 3x week  
100, 2-footed jumps off 61cm boxes**

**Jumpers had higher BMD  
& BA (3.1-4.5%)**

**Fuchs et al J Bone Miner Res 2001;16:148-156**

# Preserving bone mass in non-weight bearing sports

- Effects of a Ca-rich pre-exercise meal on biomarkers of calcium homeostasis in competitive female cyclists: randomised cross-over trial
- Using cross-over design – 32 well trained cyclists completed 90mins cycling trials – separated by one day
- High Ca – dairy based meal provided vs. placebo
- Reduction seen in PTH and marker of bone resorption

**Haakonssen et al. PLOS One 2015, May issue**

# Dairy dangers mean milk's off for our s...

# Children told - Don't drink milk

# Milk danger: Why weren't we told?

# Farm fires stoke fears of cancer in dairy goods

# Milk-allergy woman dies after two sips of tea

# Milk and Breast Cancer

# Give up dairy products

MANY who attended the event and well-researched lecture given by American Robert (author of 'Milk - The Deadly Son') will find little in Dr A Wells' letter (24.4.01) to agree. Dairy products contain a protein to the body, which reacts to it by producing mucus with this "invader".

The average dairy consumer individual lives their life with a gallon of mucus clogging internal organs, yet by giving dairy products for only seven days this harmful mucus could be expelled.

There are many better sources of calcium than dairy products: sesame seeds, watercress...

Roger Newman Turner MSc Naturopath from Harley Street, London, commented:

"The promotion of milk for its nutritional benefits is misleading. Milk...

Why aren't we told that healthy food contains... Plant beliefs are not only... mones which... prostate cancer... These studies found nature in all men they are enough... And I news for that but on the...

Hidden too much I WOND National 15th birth attendee Camilla realise I die daily rather...

I always advise cutting down on dairy products, especially those combined with sugar, because this is the food that generates mucus and plays havoc with the sinuses, but when I'm out with my sons I'm never going to say that they can't have an ice-cream. I say to students that I'm not offering...

runny nose, eczema, itchy eyes... could milk be the culprit?

# Activists target kids to put them off milk

...n. Soya consumption is linked with a significantly reduced risk of prostate cancer. Study found that men who consume soya milk more than once a day had a 70 per cent reduction of developing this disease. Soy is known to be rich in phytoestrogens, at least in part, and phytoestrogens are known as 'natural oestrogens'.

# Milk warning over dioxins from pyres

# Fears over milk and Crohn's link

...A statement from the FDA... The study looked at the... The study concluded that... The study also found that...

# Milk supplementation and postmenopausal bone loss

200 postmenopausal Chinese women consuming a habitual Ca intake of <500mg/d

Supplementation with 50g milk powder (800mg Ca/d) for 24 months

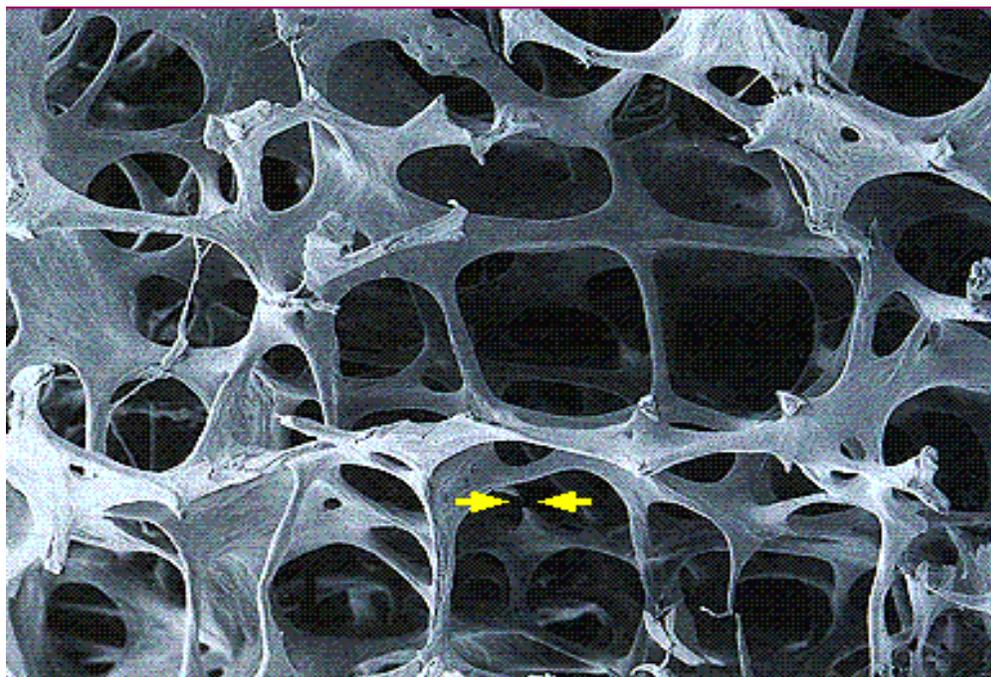
Bone loss at total hip, spine and total body significantly reduced in milk group

PTH lower and 25(OH)D higher in milk group

**Reference: Lau et al *J Bone Miner Res* 2001;16:1704-1709**

# *Effect of Milk & Milk Products on Bone Health*

- **Diets that are low in Ca are nutritionally poor in other respects**
  - **Barger-Lux et al (1992) *Clin & Applied Nutr* 1992;2:39-44**
  
- **Supplementation with milk improves the nutritional quality of the diet of post-menopausal women to a greater extent than Ca alone**
  - **Devine et al (1996) *Am J Clin Nutr* 64:731-737**



**Acid etched holes in osteoporotic bone?**

**Fox D. Hard Cheese. *New Scientist* 2001;2329:42-45**  
**New et al. Hold the soda. *New Scientist* 2002;2330:54-55.**

### ***Bone 'dissolving' foods:***

|                   |      |
|-------------------|------|
| Parmesan cheese   | 34.1 |
| Turkey Breast     | 9.9  |
| Spaghetti noodles | 6.5  |
| Milk chocolate    | 2.4  |

### ***Bone 'sparing' foods:***

|          |       |
|----------|-------|
| Oranges  | -2.7  |
| Tomatoes | -3.1  |
| Bananas  | -5.5  |
| Spinach  | -14.1 |

# *Potential Renal Acid Loads (PRAL) of Foods*

| <b>Food Group</b>                | <b>PRAL</b> |
|----------------------------------|-------------|
| Cheese with high protein content | 23.6        |
| Meat & meat products             | 9.5         |
| Bread                            | 3.5         |
| Milk & non-cheese products       | 1.0         |
| Vegetables                       | -2.8        |
| Fruits                           | -3.1        |

# Vitamin D Research

---



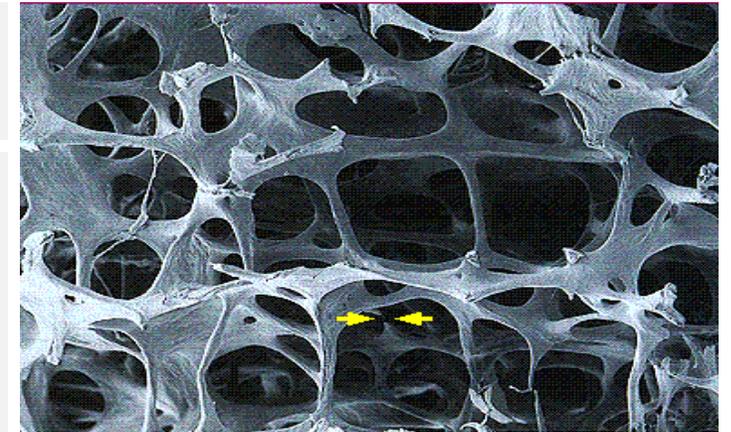
# Why is vitamin D so important?



## Vitamin D is absolutely critical to health

Children Rickets  
Adults Osteomalacia; osteoporosis

Heart Disease  
Diabetes  
Cancer  
TB  
The Common Cold!



In the UK, we can only make vitamin D between April to September

British Winter is a huge challenge for vitamin D health!

# Why is vitamin D so important?

New meta-analysis linking low vitamin D status to the common cold

The Telegraph

HOME | NEWS

## Science

Science

### Daily vitamin D dose would prevent millions of colds



The Independent 16/02/17

Lifestyle > Health & Families > Health News

### Vitamin D supplements 'the key to beating colds and flu', study finds

New research finds taking on additional nutrients protects against acute respiratory infections

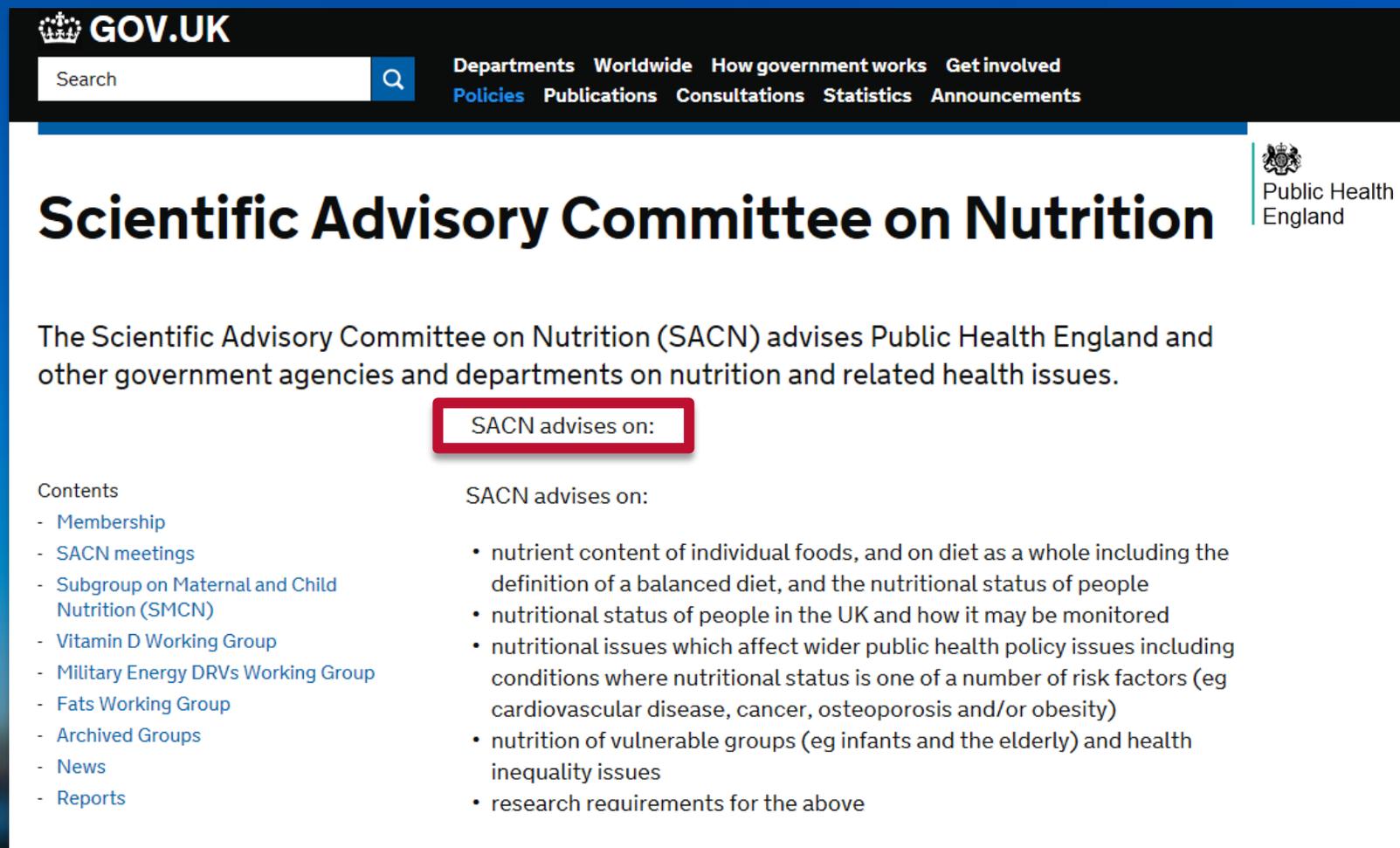
Ella Pickover | Thursday 16 February 2017 07:34 GMT | 

Click to follow  
Indy Lifestyle Online



# Vitamin D

## Innovations – Public health policy



**GOV.UK**

Search

Departments Worldwide How government works Get involved  
Policies Publications Consultations Statistics Announcements

**Scientific Advisory Committee on Nutrition**

Public Health England

The Scientific Advisory Committee on Nutrition (SACN) advises Public Health England and other government agencies and departments on nutrition and related health issues.

**SACN advises on:**

Contents

- Membership
- SACN meetings
- Subgroup on Maternal and Child Nutrition (SMCN)
- Vitamin D Working Group
- Military Energy DRVs Working Group
- Fats Working Group
- Archived Groups
- News
- Reports

SACN advises on:

- nutrient content of individual foods, and on diet as a whole including the definition of a balanced diet, and the nutritional status of people
- nutritional status of people in the UK and how it may be monitored
- nutritional issues which affect wider public health policy issues including conditions where nutritional status is one of a number of risk factors (eg cardiovascular disease, cancer, osteoporosis and/or obesity)
- nutrition of vulnerable groups (eg infants and the elderly) and health inequality issues
- research requirements for the above

## Remit and Focus

**2007**

### Update on Vitamin D

Position statement by the  
Scientific Advisory  
Committee on Nutrition

2007

**2016**

### SACN Full Risk Assessment on Vitamin D

**NEW  
VITAMIN D  
REQUIREMENTS**

Spring 2016



Public Health England's New  
Vitamin D Recommended  
Intakes was published on 21<sup>st</sup>  
July 2016

# Vitamin D

## Innovations – Public health policy

| Age group     | DRI NEW<br>(Institute of Medicine, 2010) | RNI<br>(Department of Health, 1991) |
|---------------|--|-------------------------------------|
| 0-6 months    | 15 µg (600 IU)                           | 8.5 µg (340 IU)                     |
| 7 mo - 3 y    | 15 µg (600 IU)                           | 7 µg (280 IU)                       |
| 4 - 50 years  | 15 µg (600 IU)                           | 10 µg                               |
| 51 - 64 years | 15 µg (600 IU)                           | 10 µg                               |
| 65 – 70 years | 20 µg (800 IU)                           | 10 µg (400 IU)                      |
| 71 + years    | 25 µg (1000 IU)                          | 10 µg (400 IU)                      |

**New vitamin D requirements is 10 µg/ 400IU per day**

This represents a significant challenge to the UK population since we would achieve no more than 3.5 µg/ 140IU per day

## Sources of vitamin D



You can buy vitamin D supplements  
in all chemists and supermarkets



**YES** – but the content is not as high as in other foods.

**TIP** – put your mushrooms in the sun!

A landscape photograph featuring a single tree with autumn-colored leaves standing on a grassy bank. The tree and the sky are reflected in a calm body of water in the foreground. The sky is dark blue with many stars and a small crescent moon in the upper left. The overall mood is serene and quiet.

When your shadow is longer than  
your height . . . . .

You make no vitamin D

# Vitamin D

Innovations – D-FINES Study (£0.7M, FSA funded)

## Aim:

Effect of diet and sunlight on vitamin D status.

## Outcome:

Extensive vitamin D issues in white Caucasian and South Asian populations.

## Impact:

Informed DoH, PHE;  
Led to new significant funding from BBSRC.



MANCHESTER  
1824



# Vitamin D

## Innovations – D2 v D3 Study (£0.75M, BBSRC DRINC I)

### Aim:

Does it matter if you give vitamin D<sub>2</sub> (plant source) or vitamin D<sub>3</sub> (animal sources)?

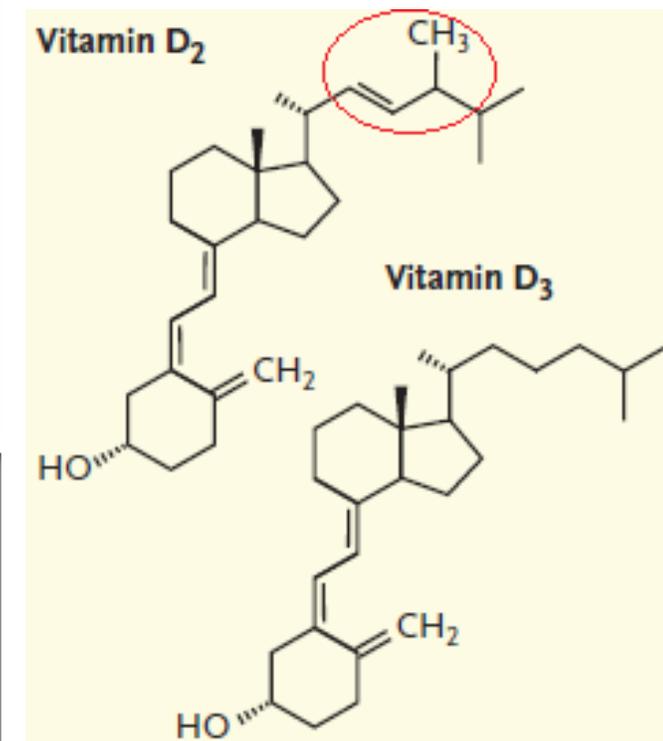
### Impact:

Key information for DoH, PHE and the food industry...

Led to exciting bid for further significant funding from BBSRC DRINC II.

### Outcome:

Vitamin D<sub>3</sub> was 50% better at raising vitamin D levels in white Caucasian and South Asian populations.



# Application BBSRC DRINC II (£0.85M) NOT FUNDED

The D-FORTISBI Study

Vitamin **D** **F**ortification of Staple Foods: A **S**ystems **B**iology Approach to Improving Vitamin D Status in the UK population

Bread & Dairy Vitamin D Fortification including Chapatti Flour

Caucasian, South Asian & Black African-Caribbean populations

Systems Biology Approach – Gene Expression & Epigenetics

Cost-effectiveness Analysis of Vitamin D Fortification

Detailed Dissemination of Vitamin D Fortification Strategies



# Vitamin D

Innovations – HM Submarines (£0.5M)

## Aim:

To provide evidence of the nutritional issues in the health of British Sub-Mariners. Focus on vitamin D.

## Impact:

Will change MoD Policy. Report currently with Surgeon General. Strong Impact Case for REF 2020.

## Outcome:

Largest study ever conducted in the world on submarines. Involves 300 Submariners on 4 boats.

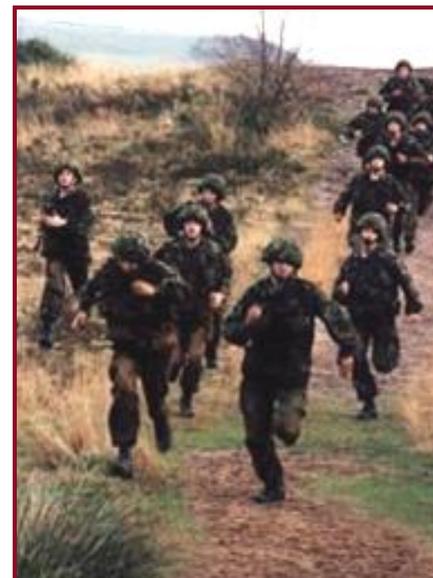


MINISTRY OF DEFENCE



# Stress fractures (SF) are a problem during military training

- High impact repetitive physical activity
- Intense activity over short time period



© Crown Copyright



© Crown Copyright

# Vitamin D

## Innovations – Royal Marines Commando (£1.2M)

### Aim:

To undertake a vitamin D supplementation study in 5000 RM Marines for stress fracture prevention.

### Impact:

Will change MoD Policy - all British Military Personnel will be offered vitamin D if proves successful. Strong Impact Case for REF 2020.

### Outcome:

Largest study ever conducted in the world on vitamin D in Military Personnel. Funded until 2020.



MINISTRY OF DEFENCE



# Other key nutrients

---



**Sodium**

**high intakes**

**Practical  
advice**



- Encourage adherence to salt reduction targets
- Achieve 'balance' (potassium, bicarbonate, calcium)

# How important good nutrition is to health! –

## Forget five a day, eat 10 portions of fruit and veg to cut risk of early death

Scientists say even just 2.5 portions daily can lower chance of heart disease, stroke, cancer and premature death



Health

## Fruit and veg: For a longer life eat 10-a-day

By James Gallagher  
Health and science reporter, BBC News



Eating loads of fruit and vegetables - 10 portions a day - may give us longer lives, say researchers.

The study, by Imperial College London, calculated such eating habits could prevent 7.8 million premature deaths each year.

# Questions

---



THE TIMES  
THE SUNDAY TIMES  
**GOOD  
UNIVERSITY  
GUIDE  
2016**  
UNIVERSITY  
OF THE  
YEAR

