



# WEEKLY EPIDEMIOLOGICAL REPORT

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## Osteoporosis - "Steps to Prevention: Calcium, Vitamin D and Exercise"

This article is published to mark the World Osteoporosis Day which falls on the 20<sup>th</sup> of October. Theme for this year is "Steps to Prevention: Calcium, Vitamin D and Exercise"

### Background

Osteoporosis is a disease affecting millions of people around the world. It is characterized by low bone mass and micro-architectural deterioration of bone tissue, leading to bone fragility and a consequent increase in risk of fracture. The incidence of vertebral and hip fractures increases exponentially with advancing age (while that of wrist fractures levels off after the age of 60 years). Osteoporosis fractures are a major cause of morbidity and disability in older people and in the case of hip fractures, can lead to premature death. Such fractures impose a considerable economic burden on health services worldwide

### Trends

Worldwide variation in the incidence and prevalence of osteoporosis is difficult to determine because of problems with definitions and diagnosis. The most useful way of comparing osteoporosis prevalence between populations is to use fracture rates in older people. However, because osteoporosis is usually not life-threatening, quantitative data from developing countries are scarce. Despite this, the current consensus is that approximately 1.66 million hip fractures occur each year worldwide, that the incidence is set to increase four-fold by 2050 because of the increasing numbers of older people. In countries with a high fracture incidence, rates are greater among women by three to four-

fold. Thus, widely regarded in these countries as a disease that affects women. But 20% of symptomatic spine fractures and 30% of hip fractures occur in men. In countries where fracture rates are low, men and women are more equally affected. The incidence of vertebral and hip fractures in both sexes increases exponentially with age.

### Diet, physical activity and osteoporosis

Diet appears to have only a moderate relationship to osteoporosis, but calcium and vitamin D are both important, especially in older populations. Calcium is one of the main bone-forming minerals and an appropriate supply to bone is essential at all stages of life. There has been considerable debate about whether current recommended intakes are adequate to maximize peak bone mass and to minimize both bone loss and fracture risk in later life, and the controversies continue.

Vitamin D is obtained either from the diet or by synthesis in the skin under the action of sunlight. Overt vitamin D deficiency causes rickets in children and osteomalacia in adults, conditions where the ratio of mineral to osteoid in bone is reduced. Poor vitamin D status in the elderly, at plasma levels of 25-hydroxyvitamin D above those associated with osteomalacia, has been linked to age-related bone loss and osteoporotic fracture, where the ratio of mineral to osteoid remains normal. Many other nutrients and dietary factors may be important for long-term bone health and the prevention of osteoporosis. Among the essential nutrients, plausible hypotheses for involvement with

### Summary of strength of evidence linking diet to osteoporotic fractures

| Evidence                                | Decreased risk  | No relationship       | Increased risk  |
|---|---|-----------------------|---|
| Convincing<br>Older people <sup>a</sup> | Vitamin D<br>Calcium<br>Physical activity                                     |                       | High alcohol intake<br>Low body weight  |
| Probable<br>Older people <sup>a</sup>   |   | Fluoride <sup>b</sup> |   |
| Possible                                | Fruits and vegetables <sup>c</sup><br>Moderate alcohol intake<br>Soy products | Phosphorus            | High sodium intake<br>Low protein intake (in older people)<br>High protein intake |

<sup>a</sup>In populations with high fracture incidence only. Applies to men and women older than 50–60 years, with a low calcium intake and/or poor vitamin D status.

<sup>b</sup>At levels used to fluoridate water supplies. High fluoride intake causes fluorosis and may also alter bone matrix.

<sup>c</sup>Several components of fruits and vegetables are associated with a decreased risk at levels of intake within the normal range of consumption (e.g. alkalinity, vitamin K, phytoestrogens, potassium, magnesium, boron). Vitamin C deficiency (scurvy) results in osteopenic bone disease.  
Source-WHO

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skeletal health, based on biochemical and metabolic evidence, can be made for zinc, copper, manganese, boron, potassium, sodium and vitamins A, C, K, and B. Evidence from physiological and clinical studies is largely lacking, and the data are often difficult to interpret because of potential size-confounding or bone remodelling transient effects.

**Strength of evidence**

For older people, there is convincing evidence for a reduction in risk of osteoporosis with sufficient intake of vitamin D and calcium together, and for an increase in risk with high consumption of alcohol and low body weight (i.e. BMI below 18.5).

**Recommendations**

In countries with a high fracture incidence, a minimum calcium intake of 400-500 mg daily is required to prevent osteoporosis. When consumption of dairy products is limited, other sources of calcium include fish with edible bones, green vegetables high in calcium and legumes. The interaction between calcium intake and physical activity, sun exposure, and intake of other dietary components (e.g. vitamin D, vitamin K, sodium, protein) and protective phytonutrients (e.g. soy compounds) needs to be considered before recommending increased calcium intake in countries with low fracture incidence in order to be in line with recommendations for industrialized countries.

The report of the Joint FAO/WHO Expert Consultation on Vitamin and Mineral Requirements in Human Nutrition made it clear that the recommendations for calcium intakes were based on long-term (90 days) calcium balance data for adults derived from Australia, Canada, the European Union, the United Kingdom and the United States, and were not necessarily applicable to all countries worldwide. The report also acknowledged that strong evidence was emerging that the requirements for calcium might vary from culture to culture for dietary, genetic, lifestyle and geographical reasons. Therefore, two sets of allowances were recommended: one for countries with low consumption of animal protein, and another based on data from North America and Western Europe.

- There is no case for global, population-based approaches. A case can be made for targeted approaches with respect to calcium and vitamin D in high-risk subgroups of populations, i.e. those with a high fracture incidence.
- In countries with high osteoporotic fracture incidence, a low calcium intake (i.e. below 400-500 mg per day) among older men and women is associated with increased fracture risk.
- In countries with high fracture incidence, increases in dietary vitamin D and calcium in the older populations can decrease fracture risk. Therefore, an adequate vitamin D status should be ensured. If vitamin D is obtained predominantly from dietary sources, for example, when sunshine exposure is limited, an intake of 5 to 10 mg per day is recommended.
- Although firm evidence is lacking, prudent dietary and some lifestyle recommendations developed in respect to other chronic diseases may prove helpful in terms of reducing fracture risk. These include:
  - Increase physical activity
  - Reduce sodium intake
  - Increase consumption of fruits and vegetables
  - Maintain a healthy body weight
  - Avoid smoking
  - Limit alcohol intake
- Convincing evidence indicates that physical activity, particularly activities that maintain or increase muscle strength, coordination and balance (which reduce the tendency to fall) as important in prevention of osteoporotic fractures. In addition, regular lifetime weight-bearing activities, especially in modes that impacts on bones and are done in vigorous fashion, increase peak bone mass in youths and help to maintain bone mass in later life.

**Source**

Recommendations for preventing osteoporosis (WHO), available from

[http://www.who.int/nutrition/topics/5\\_population\\_nutrient/en/index25.html](http://www.who.int/nutrition/topics/5_population_nutrient/en/index25.html)

Compiled by Dr. Madhava Gunasekera of the Epidemiology Unit

**Table 3 : Water Quality Surveillance  
Number of microbiological water samples - Sept / 2011**

| District     | MOH areas | No: Expected * | No: Received |
|--------------|-----------|----------------|--------------|
| Colombo      | 12        | 72             | NR           |
| Gampaha      | 15        | 90             | 32           |
| Kalutara     | 12        | 72             | 2            |
| NHIS         | 2         | 12             | NR           |
| Kandy        | 23        | 138            | NR           |
| Matale       | 12        | 72             | 8            |
| Nuwara Eliya | 13        | 78             | NR           |
| Galle        | 19        | 114            | NR           |
| Matara       | 17        | 102            | 0            |
| Hambantota   | 12        | 72             | 22           |
| Jaffna       | 11        | 66             | 64           |
| Kilinochchi  | 4         | 24             | 0            |
| Manner       | 5         | 30             | 17           |
| Vavuniya     | 4         | 24             | NR           |
| Mullatvu     | 4         | 24             | 3            |
| Batticaloa   | 14        | 84             | NR           |
| Ampara       | 7         | 42             | NR           |
| Trincomalee  | 11        | 66             | 22           |
| Kurunegala   | 23        | 138            | 25           |
| Puttalam     | 9         | 84             | 0            |
| Anuradhapura | 19        | 114            | 03           |
| Polonnaruwa  | 7         | 42             | NR           |
| Badulla      | 15        | 90             | 39           |
| Moneragala   | 11        | 66             | NR           |
| Rathnapura   | 18        | 108            | NR           |
| Kegalle      | 11        | 66             | NR           |
| Kalmunai     | 13        | 78             | NR           |

\* No of samples expected (6 / MOH area / Month)  
NR = Return not received

**Table 1: Vaccine-preventable Diseases & AFP**

08th– 14th October 2011 (41st Week)

| Disease                 | No. of Cases by Province |    |    |    |    |    |    |    |     | Number of cases during current week in 2011 | Number of cases during same week in 2010 | Total number of cases to date in 2011 | Total number of cases to date in 2010 | Difference between the number of cases to date in 2011 & 2010 |
|-------------------------|--------------------------|----|----|----|----|----|----|----|-----|---|--|---------------------------------------|---------------------------------------|---|
|                         | W                        | C  | S  | N  | E  | NW | NC | U  | Sab |   |  |                                       |                                       |   |
| Acute Flaccid Paralysis | 02                       | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00  | 02  | 01                                       | 74                                    | 67                                    | + 10.4 %  |
| Diphtheria              | 00                       | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00  | -   | -  | -                                     | -                                     | -   |
| Measles                 | 00                       | 00 | 00 | 00 | 01 | 00 | 00 | 00 | 00  | 01  | 00                                       | 111                                   | 83                                    | + 33.7 %  |
| Tetanus                 | 00                       | 01 | 00 | 00 | 00 | 00 | 00 | 00 | 00  | 01  | 01                                       | 22                                    | 20                                    | + 09.1 %  |
| Whooping Cough          | 01                       | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00  | 01  | 02                                       | 45                                    | 28                                    | + 60.7 %  |
| Tuberculosis            | 37                       | 05 | 02 | 09 | 17 | 00 | 00 | 02 | 00  | 72  | 278                                      | 7275                                  | 8077                                  | - 09.9 %  |

**Table 2: Newly Introduced Notifiable Disease**

08th– 14th October 2011 (41st Week)

| Disease       | No. of Cases by Province |    |            |            |    |                    |                    |    |            | Number of cases during current week in 2011 | Number of cases during same week in 2010 | Total number of cases to date in 2011 | Total number of cases to date in 2010 | Difference between the number of cases to date in 2011 & 2010 |
|---------------|--------------------------|----|------------|------------|----|--------------------|--------------------|----|------------|---|--|---------------------------------------|---------------------------------------|---|
|               | W                        | C  | S          | N          | E  | NW                 | NC                 | U  | Sab        |   |  |                                       |                                       |   |
| Chickenpox    | 10                       | 08 | 08         | 00         | 11 | 03                 | 03                 | 06 | 06         | 55  | 54                                       | 3494                                  | 2759                                  | + 26.7 %  |
| Meningitis    | 06<br>GM=3<br>KL=3       | 00 | 01<br>GL=1 | 01<br>MN=1 | 00 | 04<br>KN=3<br>PU=1 | 00                 | 00 | 01<br>RP=1 | 13  | 15                                       | 709                                   | 1326                                  | - 25.2 %  |
| Mumps         | 08                       | 03 | 06         | 01         | 06 | 03                 | 02                 | 02 | 11         | 46  | 12                                       | 2563                                  | 948                                   | + 170.4 %   |
| Leishmaniasis | 00                       | 00 | 01<br>MT=1 | 00         | 00 | 00                 | 05<br>AP=3<br>PO=2 | 00 | 00         | 06  | 17                                       | 653                                   | 305                                   | + 114.1 %   |

**Key to Table 1 & 2**

Provinces: W: Western, C: Central, S: Southern, N: North, E: East, NC: North Central, NW: North Western, U: Uva, Sab: Sabaragamuwa.  
 DPDHS Divisions: CB: Colombo, GM: Gampaha, KL: Kalutara, KD: Kandy, ML: Matale, NE: Nuwara Eliya, GL: Galle, HB: Hambantota, MT: Matara, JF: Jaffna, KN: Killinochchi, MN: Mannar, VA: Vavuniya, MU: Mullaitivu, BT: Batticaloa, AM: Ampara, TR: Trincomalee, KM: Kalmunai, KR: Kurunegala, PU: Puttalam, AP: Anuradhapura, PO: Polonnaruwa, BD: Badulla, MO: Moneragala, RP: Ratnapura, KG: Kegalle.

**Data Sources:**

**Weekly Return of Communicable Diseases:** Diphtheria, Measles, Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps.

**Special Surveillance:** Acute Flaccid Paralysis.

Leishmaniasis is notifiable only after the General Circular No: 02/102/2008 issued on 23 September 2008. .

**Dengue Prevention and Control Health Messages**

**You have a duty and a responsibility in preventing dengue fever. Make sure that your environment is free from water collections where the dengue mosquito could breed.**

**Table 4: Selected notifiable diseases reported by Medical Officers of Health**  
08<sup>th</sup>-14<sup>th</sup> October 2011 (41<sup>st</sup> Week)

| DPDHS Division   | Dengue Fever / DHF* |              | Dysentery  |             | Encephalitis |            | Enteric Fever |             | Food Poisoning |             | Leptospirosis |             | Typhus Fever |            | Viral Hepatitis |             | Human Rabies |           | Returns Received |
|------------------|---------------------|--------------|------------|-------------|--------------|------------|---------------|-------------|----------------|-------------|---------------|-------------|--------------|------------|-----------------|-------------|--------------|-----------|------------------|
|                  | A                   | B            | A          | B           | A            | B          | A             | B           | A              | B           | A             | B           | A            | B          | A               | B           | A            | B         | %                |
| Colombo          | 88                  | 7788         | 0          | 166         | 0            | 6          | 16            | 215         | 3              | 58          | 14            | 373         | 1            | 8          | 3               | 60          | 0            | 2         | <b>77</b>        |
| Gampaha          | 70                  | 3127         | 1          | 115         | 0            | 16         | 1             | 77          | 0              | 81          | 9             | 448         | 0            | 24         | 8               | 279         | 0            | 6         | <b>73</b>        |
| Kalutara         | 25                  | 1062         | 4          | 143         | 3            | 9          | 1             | 66          | 5              | 26          | 9             | 325         | 0            | 3          | 1               | 9           | 0            | 1         | <b>83</b>        |
| Kandy            | 68                  | 976          | 5          | 344         | 0            | 7          | 5             | 35          | 0              | 40          | 3             | 151         | 0            | 98         | 0               | 48          | 0            | 0         | <b>87</b>        |
| Matale           | 4                   | 278          | 5          | 156         | 0            | 4          | 3             | 32          | 2              | 22          | 0             | 153         | 0            | 14         | 2               | 11          | 0            | 0         | <b>92</b>        |
| Nuwara           | 11                  | 186          | 0          | 304         | 0            | 4          | 1             | 54          | 0              | 89          | 3             | 50          | 1            | 63         | 1               | 29          | 0            | 1         | <b>77</b>        |
| Galle            | 11                  | 713          | 3          | 93          | 0            | 6          | 0             | 24          | 1              | 7           | 3             | 194         | 3            | 39         | 0               | 10          | 0            | 5         | <b>84</b>        |
| Hambantota       | 3                   | 351          | 3          | 57          | 0            | 4          | 0             | 4           | 0              | 29          | 3             | 481         | 0            | 56         | 1               | 14          | 0            | 1         | <b>83</b>        |
| Matara           | 23                  | 447          | 0          | 77          | 0            | 2          | 0             | 15          | 1              | 31          | 6             | 320         | 2            | 71         | 2               | 20          | 0            | 1         | <b>100</b>       |
| Jaffna           | 6                   | 287          | 15         | 276         | 0            | 3          | 8             | 236         | 1              | 84          | 0             | 2           | 1            | 195        | 0               | 28          | 0            | 1         | <b>82</b>        |
| Kilinochchi      | 1                   | 53           | 0          | 30          | 0            | 3          | 0             | 9           | 0              | 13          | 0             | 2           | 0            | 11         | 0               | 3           | 0            | 0         | <b>50</b>        |
| Mannar           | 2                   | 29           | 0          | 22          | 0            | 1          | 1             | 31          | 1              | 83          | 0             | 13          | 0            | 32         | 0               | 2           | 0            | 0         | <b>80</b>        |
| Vavuniya         | 1                   | 70           | 2          | 32          | 0            | 12         | 1             | 10          | 7              | 56          | 1             | 45          | 0            | 2          | 0               | 1           | 0            | 0         | <b>75</b>        |
| Mullaitivu       | 0                   | 16           | 0          | 60          | 0            | 1          | 0             | 4           | 0              | 9           | 0             | 5           | 0            | 1          | 0               | 2           | 0            | 0         | <b>75</b>        |
| Batticaloa       | 16                  | 753          | 7          | 549         | 0            | 5          | 0             | 7           | 0              | 25          | 0             | 27          | 0            | 3          | 0               | 2           | 0            | 6         | <b>86</b>        |
| Ampara           | 2                   | 140          | 12         | 182         | 0            | 1          | 1             | 11          | 0              | 47          | 0             | 57          | 0            | 1          | 0               | 8           | 0            | 0         | <b>43</b>        |
| Trincomalee      | 2                   | 144          | 6          | 615         | 0            | 2          | 0             | 10          | 0              | 12          | 0             | 88          | 0            | 7          | 0               | 7           | 1            | 1         | <b>100</b>       |
| Kurunegala       | 13                  | 779          | 5          | 307         | 0            | 12         | 2             | 87          | 6              | 83          | 13            | 1481        | 3            | 72         | 1               | 40          | 0            | 4         | <b>78</b>        |
| Puttalam         | 4                   | 409          | 2          | 168         | 0            | 1          | 3             | 30          | 0              | 9           | 2             | 116         | 0            | 17         | 0               | 7           | 0            | 2         | <b>83</b>        |
| Anuradhapu       | 2                   | 238          | 0          | 121         | 0            | 2          | 1             | 5           | 1              | 34          | 0             | 238         | 0            | 16         | 1               | 19          | 0            | 1         | <b>84</b>        |
| Polonnaruw       | 2                   | 254          | 0          | 110         | 0            | 1          | 0             | 12          | 0              | 22          | 0             | 82          | 0            | 1          | 0               | 16          | 0            | 0         | <b>71</b>        |
| Badulla          | 8                   | 505          | 14         | 316         | 1            | 6          | 1             | 51          | 0              | 24          | 0             | 74          | 3            | 79         | 0               | 57          | 0            | 0         | <b>88</b>        |
| Monaragala       | 8                   | 223          | 7          | 113         | 0            | 4          | 1             | 34          | 0              | 13          | 2             | 179         | 2            | 70         | 1               | 77          | 0            | 0         | <b>100</b>       |
| Ratnapura        | 17                  | 837          | 8          | 452         | 0            | 7          | 0             | 48          | 0              | 20          | 10            | 511         | 0            | 27         | 1               | 47          | 0            | 2         | <b>61</b>        |
| Kegalle          | 41                  | 744          | 1          | 100         | 0            | 12         | 1             | 69          | 0              | 24          | 5             | 307         | 0            | 31         | 8               | 205         | 0            | 0         | <b>82</b>        |
| Kalmune          | 2                   | 32           | 3          | 532         | 0            | 0          | 0             | 1           | 0              | 67          | 0             | 6           | 0            | 2          | 0               | 3           | 0            | 1         | <b>77</b>        |
| <b>SRI LANKA</b> | <b>430</b>          | <b>20441</b> | <b>103</b> | <b>5440</b> | <b>04</b>    | <b>131</b> | <b>47</b>     | <b>1177</b> | <b>28</b>      | <b>1008</b> | <b>83</b>     | <b>5728</b> | <b>16</b>    | <b>943</b> | <b>30</b>       | <b>1004</b> | <b>01</b>    | <b>35</b> | <b>82</b>        |

Source: Weekly Returns of Communicable Diseases WRCD).

\*Dengue Fever / DHF refers to Dengue Fever / Dengue Haemorrhagic Fever.

\*\*Timely refers to returns received on or before 13<sup>th</sup> October, 2011 Total number of reporting units =329. Number of reporting units data provided for the current week: 268

A = Cases reported during the current week. B = Cumulative cases for the year.

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Comments and contributions for publication in the WER Sri Lanka are welcome. However, the editor reserves the right to accept or reject items for publication. All correspondence should be mailed to The Editor, WER Sri Lanka, Epidemiological Unit, P.O. Box 1567, Colombo or sent by E-mail to [chepid@sltnet.lk](mailto:chepid@sltnet.lk).

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