



# VITAMIN D

July 2015

# insight

Over 43% of people living on the South coast of NSW are deficient in Vitamin D at the end of winter (<50nmol/L)

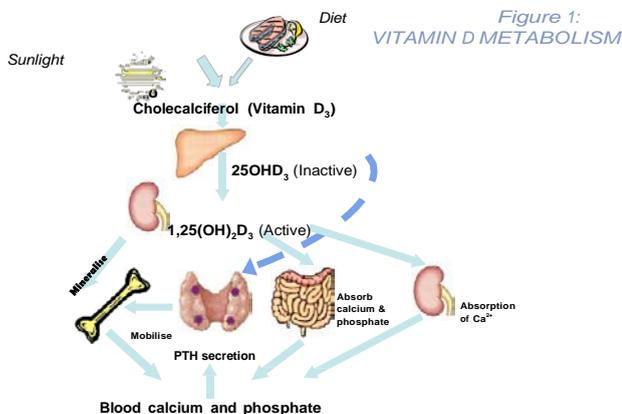
Tests for vitamin D are Medicare rebatable.

## Vitamin D Deficiency is common

Vitamin deficiency is common on the South coast of NSW affecting over 30% of people on average and over 40% in winter months. Recent Australian studies have shown the extent of vitamin deficiency in Australia and have highlighted the importance of Vitamin D deficiency as a major public health problem.

## What does vitamin D do?

Vitamin D is required by the body to regulate blood calcium levels by promoting calcium absorption from food in the intestines and calcium reabsorption in the kidneys.



## What is the impact of vitamin D deficiency?

Inadequate sunlight exposure is the major cause of vitamin D deficiency. This triggers parathyroid hormone (PTH) secretion which in turn increases bone resorption.

PTH also stimulates renal excretion of phosphate causing phosphate deficiency.

Consequently, these combinations result in impaired bone mineralisation leading to bone softening diseases, rickets in children and osteomalacia in adults. It may also contribute to osteoporosis.

There is emerging evidence to suggest that vitamin D deficiency is also associated with a number of chronic diseases including certain cancers, autoimmune diseases and infections.

## Who is at risk of vitamin D deficiency?

Low sun exposure is the main cause of vitamin D deficiency; living or working indoors, residing in the southern latitudes of Australia, covering up exposed skin and avoiding outdoor activities are contributing factors. Deficiency is more common in winter than spring.

## BIOCHEMICAL TESTS FOR DIAGNOSIS AND MONITORING OF VITAMIN D DEFICIENCY

### Vitamin D

25-OH Vit D is the major circulating and storage form of vitamin D and is used to assess vitamin D status.

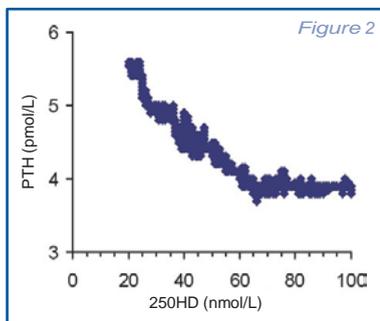
To monitor the treatment response, 25-OH Vit D can be measured 2-3 months after commencing supplementation as vitamin D has a long half-life (2-3 weeks).

## What cut-off should we use to indicate vitamin D deficiency?

There is no universally accepted optimal level of 25-OH Vit D for vitamin sufficiency. Different cut-off values (50 to 80 nmol/L) have been recommended based on national and international experts' consensus. The variation is probably due to different assay methods used in the studies that these recommendations were based on.

Southern IML Pathology currently use the following measurements to interpret 25-OH Vit D results:

25-OH Vit D (nmol/L)	Vitamin D status
<50	Deficient
50-75	Indeterminate
>75	Sufficient



These measurements have been derived through our use of a modern automated method (Diasorin Liaison) for the analysis of 25-OH Vit D. We have evaluated the optimal cut off value for this 25 OH Vit D

assay using serum PTH as a surrogate marker from data available in our database. Figure 2 shows that when serum 25-OH Vit D levels fall below 65 nmol/L PTH begins to rise steadily. This indicates that using our assay, a level of 25-OH Vit D below 65 nmol/L is physiologically insufficient. To interpret actual results from individual patients however, we also need to consider assay imprecision. Despite our current 25-OH Vit D assay being one of the best assays available, a 25-OH Vit D level of 65 nmol/L could fall anywhere between 50 and 75 nmol/L on repeat analysis.

## PTH

PTH may be used sometimes to evaluate a borderline low 25-OH Vit D. An elevated PTH with a low 25-OH Vit D confirms vitamin D deficiency. However, a PTH level within reference interval does not exclude vitamin D deficiency.

## Serum Calcium, Phosphate and Magnesium

Hypocalcaemia and hypophosphataemia may occur in severe vitamin D deficiency although serum calcium and phosphate are usually normal in mild-moderate deficiency.

In people who are on calcitriol (1,25[OH]<sub>2</sub>D) supplementation, serum calcium and phosphate are used to monitor treatment as toxicity could result in hypercalcaemia.

Measurement of serum magnesium is sometimes necessary as hypomagnesaemia may blunt the PTH rise in response to vitamin D deficiency.

## LFT and UEC

These tests are important to ensure the active form of vitamin D (1,25[OH]<sub>2</sub>D) can be produced.

## TREATMENT FOR VITAMIN D DEFICIENCY

Treatment strategies for moderate to severe vitamin D deficiency usually require vitamin D supplementation coupled with advice to increase sun light exposure. Dietary modification alone (even with vitamin-D fortified foods) will not provide adequate amounts of vitamin D. For people who have 25-OH Vit D levels in the equivocal range (50-75nmol/L) but are not in the high risk group, it may be advisable to increase sunlight exposure, then to measure 25-OH Vit D again in three months.

## Vitamin D supplementation and toxicity

Currently most of the supplements are in vitamin D<sub>3</sub> form (cholecalciferol) in Australia. For adults with moderate to severe deficiency, it is recommended to start vitamin D<sub>3</sub> such as Ostelin or OsteVit-D at 3000-5000 IU per day for at least 6-12 weeks then 1000 IU for ongoing treatment. This treatment is also applicable to women during pregnancy. Vitamin D toxicity due to supplementation is rare. It has been reported that supplementing 10,000 IU per day orally for 90 days in postmenopausal women did not result in adverse effects.

Repeat testing in 3 to 4 months can be undertaken to confirm that the deficiency state has been corrected by treatment.

For further information please contact Southern.IML Pathology on 4224 7474