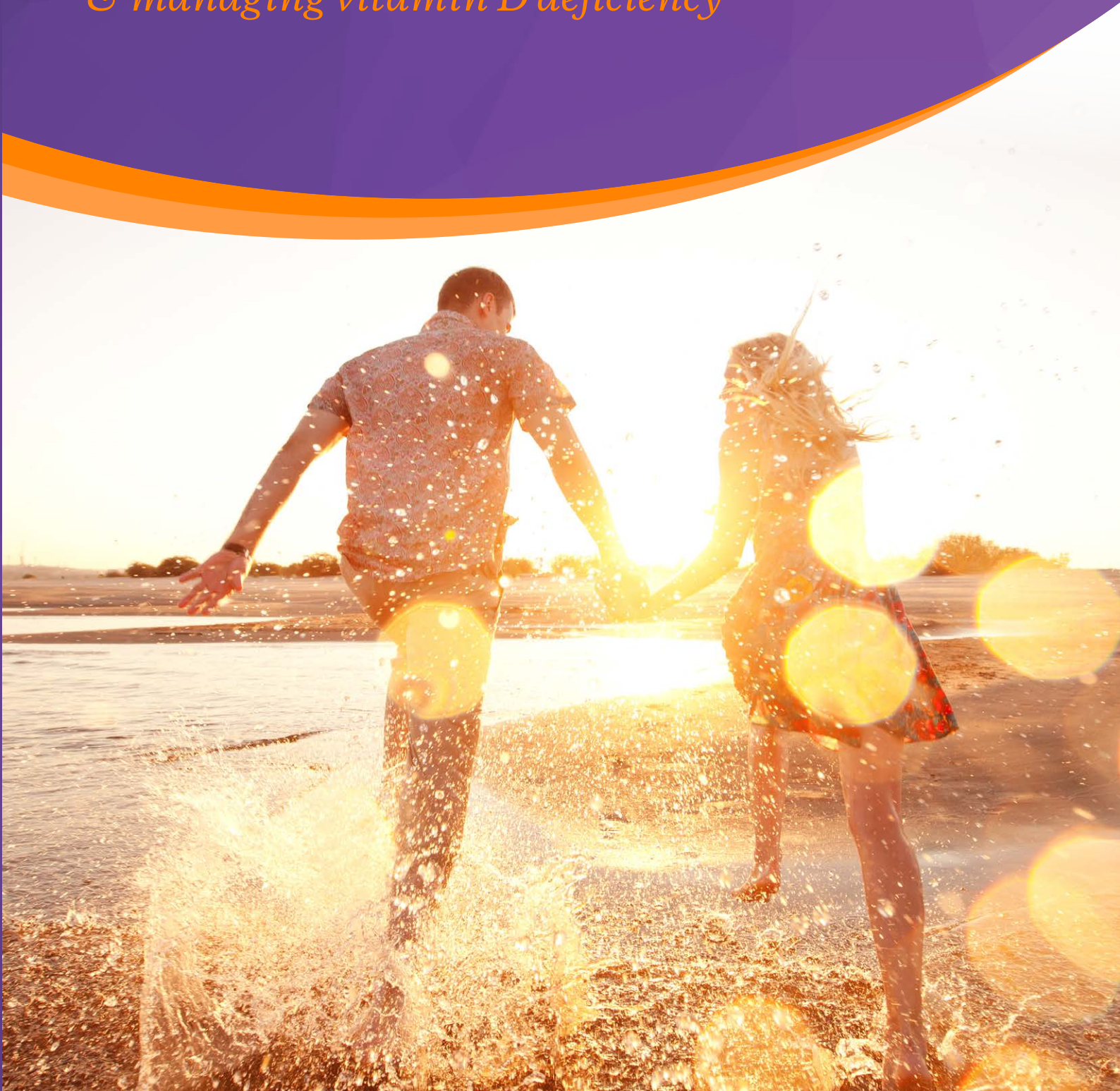


Vitamin D Testing

*Providing you with insight in identifying
& managing vitamin D deficiency*



Vitamin D deficiency and health implications

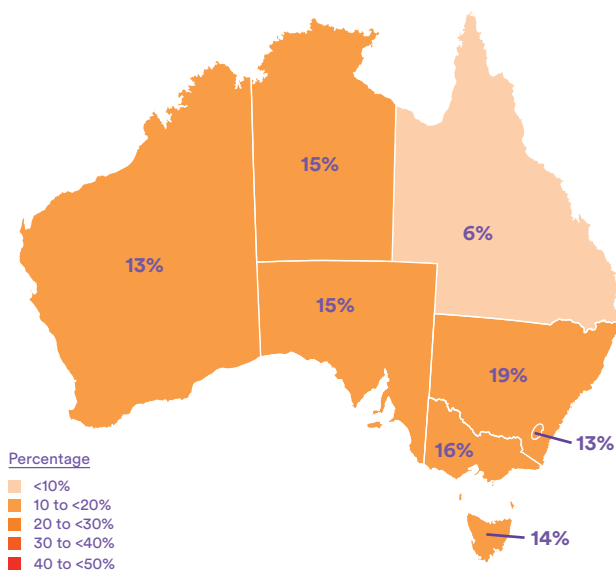
The Australian Health Survey 2011–12 (ABS 2014b) found that 23% of Australian adults had vitamin D levels under the target of 50 nmol/L (vitamin D deficiency). This was lower in summer (14%) and higher in winter (36%).

Vitamin D deficiency is of concern as it can lead to a variety of health conditions such as a loss of bone density, which can contribute to osteoporosis and fractures. Moderate to severe vitamin D deficiency in infants and children can lead to rickets (soft bones). Low levels of vitamin D have also been found in association with other

health conditions such as cardiovascular disease, diabetes, immune system diseases, microbial and respiratory diseases, cognitive impairment in older adults, mental health and cancer.

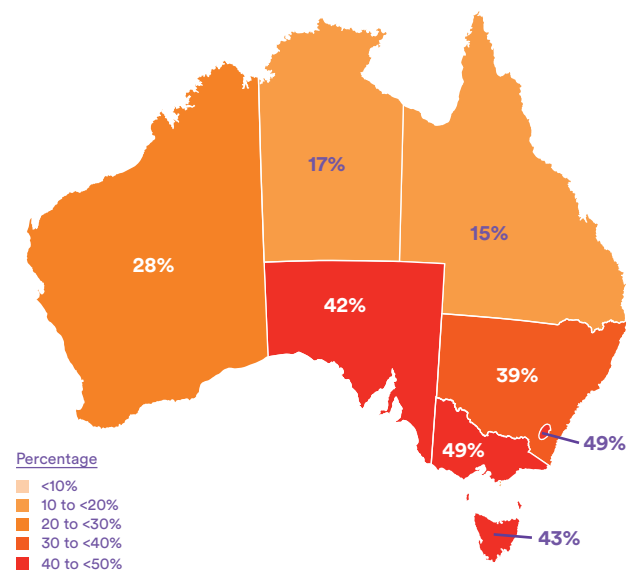
The below diagrams indicate the percentage of Australians with a vitamin D deficiency in summer (diagram 1) versus winter (diagram 2). As you can see, people residing in the southern states have an increased incidence of low circulating serum vitamin D levels, particularly during winter.

Diagram 1 - Vitamin D deficiency in summer by state (2011-2012)



Source: Australian Health Survey: Biomedical Results for Nutrients

Diagram 2 - Vitamin D deficiency in winter by state (2011-2012)



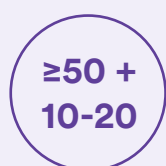
Source: Australian Health Survey: Biomedical Results for Nutrients

Target vitamin D levels

The international recommendations for adequate vitamin D levels vary, but based on a review of current literature and recently published recommendations^{1,2} experts suggest that adequate vitamin D status is a serum level equal to or greater than 50 nmol/L at the end of winter. This level should be 10-20 nmol/L higher at the end of summer to allow for seasonal decrease.

This figure is based on the level below which parathyroid hormone concentrations begin to rise and the risk of fractures increases.

As for all tests, Australian Clinical Labs' pathologists and scientists will continue to evaluate current literature and our target range may change as evidence emerges.



adequate vitamin D levels in nmol/L at the end of summer

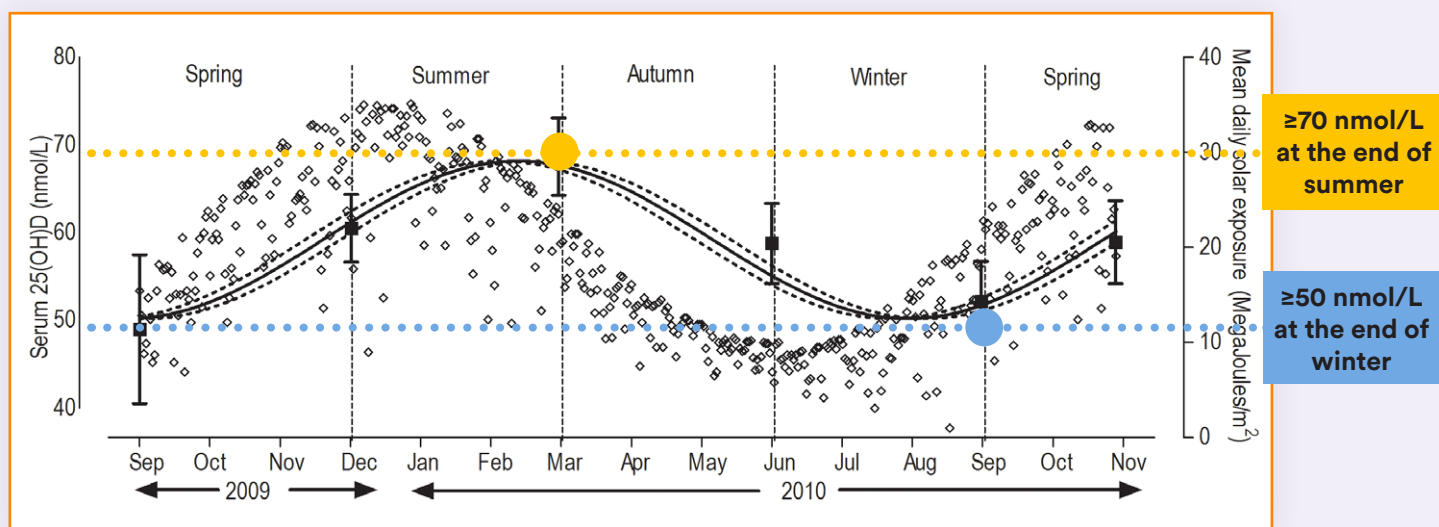


adequate vitamin D levels in nmol/L at the end of winter



Vitamin D levels throughout the year

The below graph (graph 1) shows how the vitamin D levels in older Tasmanians vary throughout the year and where our target vitamin D levels sit within this. The number of people that sit below the target levels can clearly be seen.



Graph 1 - Relationship between mean daily solar exposure and serum 25(OH)D concentrations ⁵.

Clinical recommendations

When to test

Vitamin D testing should be ordered for patients at risk of vitamin D deficiency.

The best time to test vitamin D levels is at the end of winter, or in early spring, when patient vitamin D levels are at their lowest.

Who to test

- The housebound – including sick or disabled people
- Elderly in high care
- People with darker skin
- People who cover their skin due to religious or cultural reasons
- People who regularly avoid the sun
- People who work indoors

- Also, patients with:
 - signs, symptoms and/or planned treatment of osteoporosis or osteomalacia
 - increased alkaline phosphatase with otherwise normal LFTs
 - hyperparathyroidism, hypo- or hypercalcaemia or hypophosphataemia
 - malabsorption (i.e. CF, IBD, coeliac, etc)
 - medications known to decrease vitamin D levels (i.e. anticonvulsants)
 - patients with chronic renal failure and transplant recipients

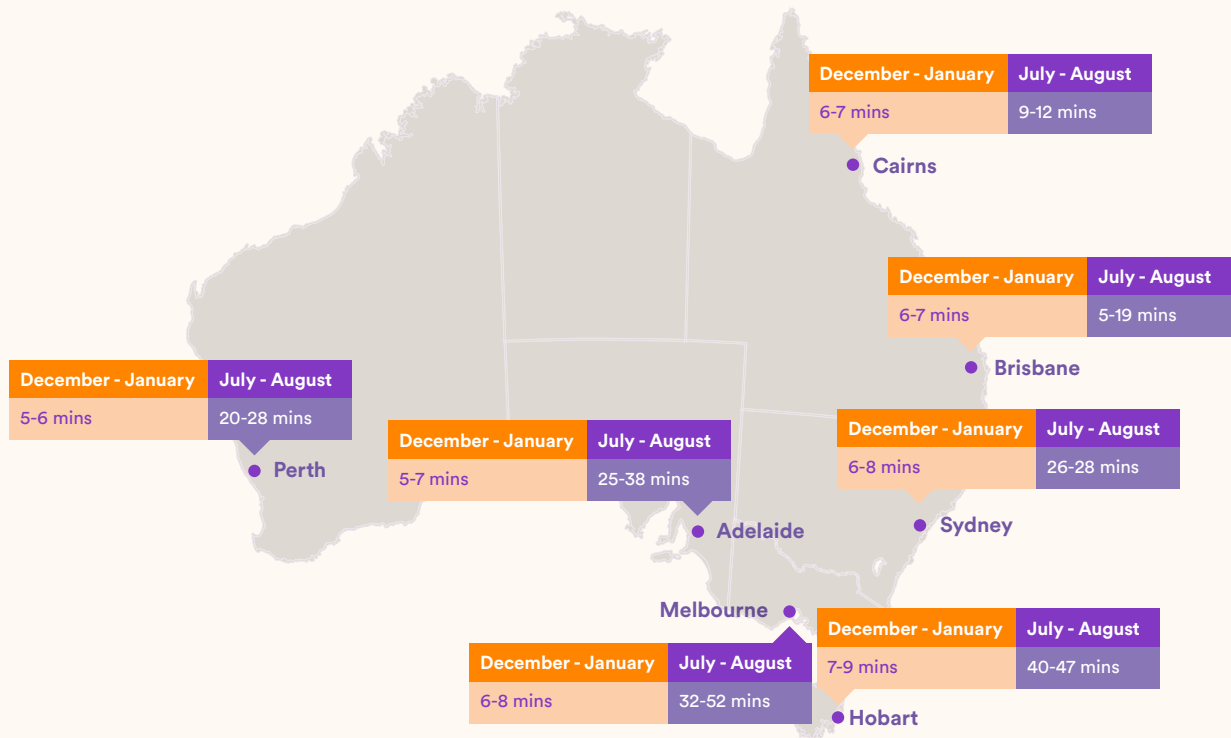
Follow-up testing

Serum 25-OHD should be retested no earlier than 3 months following commencement of supplementation with vitamin D or change in dose.

Once a desirable target has been achieved, especially at the end of winter, no further testing is required unless risk factors change ².

Treatment

To ensure adequate levels of vitamin D are maintained throughout the year, the following sun exposure times (mins per day) are recommended for 1/3MED for moderate fair skin, at either 10am or 2pm daily⁶.



If patients are unable, for a variety of reasons, to gain the required amount of sun exposure for vitamin D production, supplementation may be required.

A maintenance dose of up to 1000 IU/day may be adequate, however some individuals will require higher doses. Severe vitamin D deficiency (serum level <20 nmol/L) may require 3000-5000 IU/day for 6-12 weeks.

Supplements should be vitamin D3 and adequate dietary calcium is also required. This should be at least 1g/day and up to 1.3g/day in an older adult. Many will require supplementation to achieve this amount.

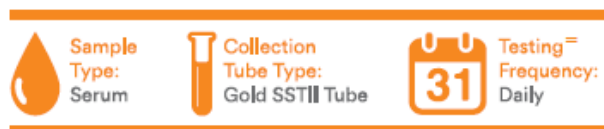
Note: Calcium supplements are best taken before sleep to ensure maximum absorption and suppression of peak bone turnover which usually occurs between approximately 2am and 3am.



Vitamin D testing at Clinical Labs

How we test for vitamin D

Vitamin D tests measure the total concentration of vitamin D, 25-hydroxyvitamin D (25-OHD), in the patient's blood.



Australian Clinical Labs' utilise fully automated, state-of-the-art equipment to deliver accurate and reliable results.

The Siemens assay used by our labs for measuring vitamin D is traceable to the NIST-Ghent University developed reference measurement procedure (RMP) based on isotope-dilution liquid chromatography-tandem mass spectrometry (ID-LC/MS/MS)^{3,4}.

What information is included in the report

- the concentration of total 25-hydroxyvitamin D (25-OHD) in a patient's serum
- previous test results for comparison (if applicable)
- and suggested cut points to define sufficient, deficient and severely deficient vitamin D levels

Further testing

- A serum calcium assessment and parathyroid hormone (PTH) will assist in placing the vitamin D level within the context of overall calcium homeostasis
- If Osteoporosis is present, fasting blood crosslaps (CTX) will provide a way of monitoring bone turnover in response to therapy
- An individual's response to vitamin D supplementation can vary and should be checked after approximately 3 months of therapy

How to Order

Request form instructions

Medicare restrictions apply as to the reasons for bulk billing. Please refer to 'Who to test' on page 3 for examples.

Patient instructions

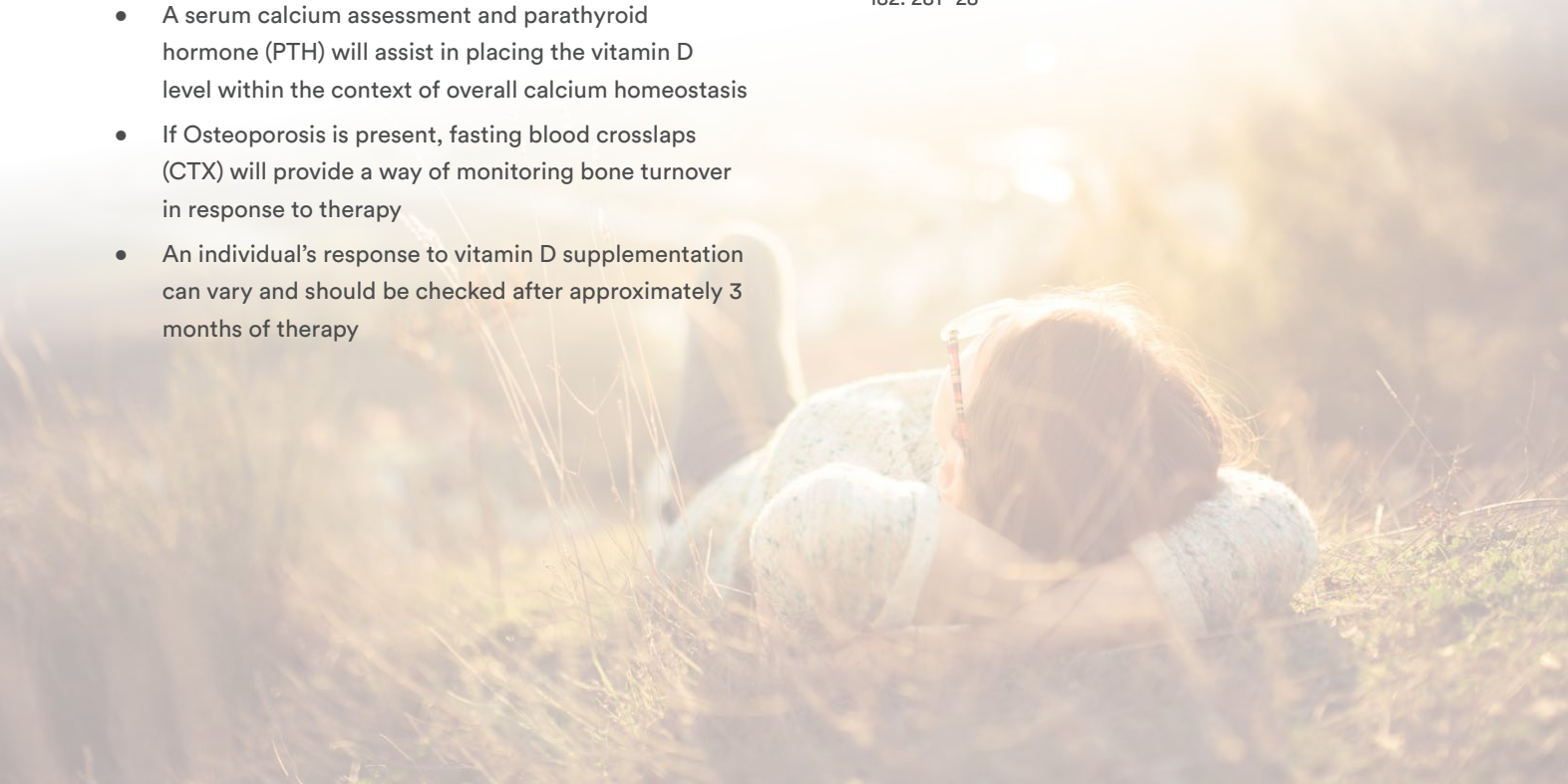
N/A – there are no special patient requirements prior to testing.

Specimen requirements

Serum collected using a Gold SSTII tube.

References

1. Vitamin D and health in adults in Australia and New Zealand: a position statement. MJA 196(11), 18 June 2012.
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3. Thienpont L, Stepman HCM, Vesper HW. Standardisation of measurements of 25-Hydroxyvitamin D3 and D2. Scandinavian Journal of Clinical & Laboratory Investigation, 2012; 72 (Suppl 243): 41-49.
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5. Pittaway JK, Ahuja KDK, Beckett JM, Bird M-L, Robertson IK, et al. (2013) Make Vitamin D While the Sun Shines, Take Supplements When it Doesn't: A Longitudinal, Observational Study of Older Adults in Tasmania, Australia. PLoS ONE 8(3): e59063. doi:10.1371/journal.pone.0059063.
6. Working Group of the Australian and New Zealand Bone and Mineral Society, Endocrine Society of Australia and Osteoporosis Australia. Vitamin D and adult bone health in Australia and New Zealand: a position statement. MJA 2005; 182: 281-28



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