Recommendations for those living outside Tasmania

Perform a blood test
The risk of being vitamin D deficient is generally higher when living further away from the equator and lower when living closer to the equator because of differences in strength of the sun.
However, behaviour such as the amount of time spent outside, the time of day being outside, the amount of clothing worn and the use of sunscreen are also important determinants of your level of vitamin D.
A blood test, performed by a medical doctor, is the best method to determine whether there is a need to increase your vitamin D levels.

Ways to increase Vitamin D levels
The information provided in this brochure on vitamin D supplementation and dietary intake is applicable to all people with MS, irrespective of the location of living. However, the recommendations on sun exposure are based on Tasmanian data and might not apply to other locations. Less sun exposure might be sufficient at lower latitude locations, while more might be required at higher latitude locations. Use your local authorities, such as a Cancer Council, to guide you on the appropriate amount of sun exposure.

References

Disclaimer
This is general information developed by Dr Ingrid van der Mei of the Menzies Research Institute. The information contained in this section should not be used for individual medical advice. Please see your doctor if you have concerns or specific questions relating to your health.

3. Increase vitamin D through dietary intake of food
Less than 5% of the vitamin D in our body comes from dietary sources. The best source is fatty fish, such as mackerel, herring and salmon. Liver, eggs and fortified foods, such as margarine and some milks, also contain a very small amount of vitamin D. For most Australians, adequate vitamin D is unlikely to be achieved through diet alone.

In brief
• Vitamin D is required for optimal bone and muscle health and appears to have a wide range of other important functions in the body. Low vitamin D may be associated with several diseases including MS.
• In Tasmania, the risk of becoming vitamin D deficient is particularly high in winter and spring. For people with MS, those with a higher level of disability are more often vitamin D deficient all year round compared to those with a lower level of disability.
• A simple blood test can determine your current vitamin D levels.
• If levels are low, the best ways to increase your body’s vitamin D levels are to:
  - Take a vitamin D supplement of at least 1000 IU per day.
  - Increase your exposure to the sun safely - see tables 1 and 2.

Introduction
Vitamin D is a steroid hormone that is predominantly produced in the body when the skin is exposed to the ultraviolet (UV) rays in sunlight. Vitamin D is required for optimal bone health, and vitamin D deficiency can lead to osteoporosis and influence neuromuscular function (strength and balance).

This can result in falls and ultimately fractures. Interestingly, recent literature has suggested that vitamin D deficiency might also be associated with the onset of diseases such as multiple sclerosis (MS), colorectal cancer, breast cancer, prostate cancer, type 1 diabetes, cardiovascular diseases and tuberculosis, indicating that ultraviolet radiation and/or vitamin D does much more in the body than maintain optimal bone health.

Because sunshine and vitamin D have the potential to dampen an over-active immune system, it is conceivable that sunshine and/or vitamin D might slow the progression of MS, but this is not proven. We are currently analysing the data of the Longitudinal Study of Multiple Sclerosis in Southern Tasmania to examine this issue. Groups particularly at risk of vitamin D deficiency include those who spend less time outside, such as the elderly, or those who are institutionalised.

Findings of the Menzies Research Institute
We examined the vitamin D levels of people with and without MS who were living in Tasmania (43°S latitude) and were under the age of 60 years. Figure 1 shows the occurrence of moderate to severe vitamin D deficiency (black blocks) and mild vitamin D deficiency (grey blocks) for people with MS categorised by level of disability. In the low disability group, people had no disability or could walk an unlimited distance without rest but not run. As vitamin D levels are higher in summer/autumn and lower in winter/spring, a separate graph is provided for the two seasons.
The figure shows two things. Firstly, vitamin D deficiency is much higher in winter/spring compared to summer/autumn. Secondly, people with a higher disability are more likely to have moderate to severe vitamin D deficiency. Indeed, those with a higher disability were three times more likely to have low vitamin D levels (<40 nmol/L) compared to a healthy control group.

Level of disability was strongly associated with lower vitamin D levels and with lower levels of sun exposure. Thus, it seems that people with a higher disability may spend less time outside and therefore have lower vitamin D levels.

Importantly, those with no or a low disability were as likely as the control group to have low vitamin D levels, indicating that vitamin D deficiency is also a concern among the general Tasmanian population. Thus, even among healthy individuals, mild vitamin D deficiency is concerning common.

### Ways to increase Vitamin D levels

The recommended minimum vitamin D level is 50 nmol/L, but recent research suggests there may be additional benefits in maintaining vitamin D levels of 75 nmol/L or higher.

Individuals vary in their vitamin D levels and in their response to efforts to increase levels. To check your own vitamin D levels, you should ask your treating doctor for a blood test. He/she can then advise you on whether you need to increase your vitamin D levels.

Theoretically, there are three ways to increase vitamin D levels.

- **Vitamin D supplements:**
- **Increasing exposure to sunlight:**
- **Increasing the intake of foods containing vitamin D:**

### 1. Vitamin D supplementation

**Vitamin D dose required to prevent deficiency**

The current recommended intake of vitamin D for adults in Australia is 400 IU per day. However, there is general consensus among scientists that this should be much higher, at least 1000 IU per day, a level now also recommended by the Canadian Cancer Society. Vitamin D deficiency is currently defined as a blood test level above 50 nmol/L, but some measures of health may improve at higher levels. For example, bone metabolism continues to improve up to 100 nmol/L. Taking 1000 IU per day seems to increase vitamin D levels on average to about 70 nmol/L, and 4000 IU per day seems to increase vitamin D levels on average to about 100 nmol/L. No adverse effects have been reported at these doses.

It is important to realise that some people require more vitamin D than others to reach a given level of vitamin D in their blood. In addition, the level of vitamin D in the body also depends on the amount of exposure to the sun.

**Vitamin D required to treat moderate to severe deficiency**

A medical doctor such as a general practitioner can request a blood test to have your vitamin D levels assessed and can assist you in your treatment. To treat moderate to severe vitamin D deficiency, supplementation with 3000-5000 IU (3-5 capsules) is recommended for 6-12 weeks, after which e.g. 1000 IU per day can be used. Alternatively, higher single doses can be taken, e.g. 500,000 IU (using 50,000 IU capsules) or 1 capsule of 50,000 IU once a month for 3-6 months, after which e.g. 1000 IU per day can be used.

**Vitamin D supplements currently available in Australia**

There are three over-the-counter pure vitamin D preparations available in Australia, OsteVit-D, Ostelin Vitamin D3 and Blackmores Vitamin D3. Each capsule contains 1000 international units (IU). OsteVit-D and Blackmores both contain vitamin D3 (cholecalciferol), while Ostelin contains vitamin D2 (ergocalciferol). People do not produce vitamin D2 naturally in the body and vitamin D2 seems a little less effective in raising vitamin D levels than vitamin D3. OsteVit-D is the least expensive, retailing for around $35 for 250 capsules. Alternatively, a high dose preparation of vitamin D3 (50,000 IU per capsule, taken monthly, around $60 for 12 capsules) can be ordered at Chemist Warehouse (144 Murray St, Hobart) with a prescription from a specialist physician, geriatrician, endocrinologist or dermatologist.

If you decide to take a vitamin D supplement, we suggest that you inform your health professional.

### 2. Increase exposure to the sun safely

**Sun exposure required to prevent deficiency**

Table 1 provides an overview of recommendations to prevent vitamin D deficiency based on data of Menzies Research Institute studies that include people with MS.

The data suggests that in Tasmania:

- **In summer**, those with a low disability seem generally able to maintain vitamin D levels above 50 nmol/L irrespective of the level of sun exposure, and are generally able to maintain levels above 75 nmol/L if they go outside 1-2 hours a day during weekends and holidays, using WHO sun protection recommendations (Table 2).
- **In summer**, for those with a higher level of disability, having 1-2 hrs a day of sun exposure during weekends and holidays (using WHO sun protection recommendations, Table 2) seems sufficient for most to maintain levels at 50 nmol/L. The combination of sun exposure and a vitamin D supplement would further increase vitamin D levels.
- **In winter**, irrespective of level of disability or amount of sun exposure, it is difficult to maintain vitamin D levels above 50 nmol/L in Tasmania. Therefore, a vitamin D supplement might be required to ensure vitamin D adequacy.

**Table 2. WHO sun protection recommendations for skin cancer prevention.**

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<thead>
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**Table 1. Recommendations for Tasmanians with Multiple Sclerosis to prevent vitamin D deficiency.**

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Information on Vitamin D levels for People with Multiple Sclerosis

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