Vitamin D and UV radiation

The sun's ultraviolet (UV) radiation is both a major cause of skin cancer and the best natural source of vitamin D. In Victoria, it is important to take a balanced approach to UV exposure to reduce the risk of skin cancer, while getting some exposure to help with vitamin D levels.

What is vitamin D?
Vitamin D is a hormone that controls calcium levels in the blood. It is needed to develop and maintain healthy bones, muscles and teeth and is also important for general health.

Vitamin D is made through a series of biochemical processes that start when the skin is exposed to the sun's UV rays.

Vitamin D occurs naturally in fish and eggs, while margarine and some types of milk have added vitamin D. Food however, only makes a small contribution (approx. 5-10%) to the body's overall vitamin D levels and it is therefore difficult to get enough from diet alone.

How do I take a balanced approach to UV exposure?
The body can only absorb a limited amount of vitamin D at a time. Once a person has received enough UV exposure, spending extra time in the sun won't increase vitamin D levels – but will increase the risk of skin cancer. How much UV exposure a person needs depends on the time of year, UV levels, skin type and current vitamin D levels.[1, 2]

September to April
In Victoria from September to April (when UV levels are regularly 3 or higher) a combination of sun protection measures should be used – even for people who have been diagnosed with a vitamin D deficiency.

During this time of year, most people make enough vitamin D because UV levels are high and more time is spent outdoors. During these months, most Victorians need just a few minutes of mid-morning or mid-afternoon sun exposure for their vitamin D needs, and should be extra cautious in the middle of the day when UV levels are most intense.

May to August
From May to August in Victoria, sun protection is not recommended. UV levels are lower, so people are encouraged to be outdoors around midday each day, with some skin uncovered. Being physically active outdoors will also help the body to make vitamin D. People with naturally very dark skin may need more UV exposure.[3]

People who work outdoors for long periods of time may need sun protection all year, as they have an increased risk of skin cancer.[4] At this time of year, sun protection is also recommended when near reflective surfaces (such as snow), or if UV levels reach 3 or higher.

Will sunscreen stop you from making enough vitamin D?
Sunscreen use should not put people at risk of vitamin D deficiency. When sunscreen is tested in lab conditions it has been shown to decrease vitamin D production, however regular use in real life has been shown to have little effect on vitamin D levels. This is probably because those people who use more sunscreen, spend more time in the sun, so naturally will have higher vitamin D levels.[5,6,7]

Vitamin D deficiency
Vitamin D is crucial for bone and muscle development and overall health. It is recommended vitamin D levels are 60-70 nmol/L at the end of summer or >50 nmol/L at the end of winter.

If vitamin D levels are too low, there may be no obvious symptoms. But without treatment, there can be significant health effects including bone and muscle pain, poor bone mineralisation (softer bones), rickets (bone deformity) in children and osteomalacia in adults.[8,9] There have also been links with an increased risk of bowel cancer, heart disease, infections and auto-immune diseases, although more research is needed to determine whether increasing vitamin D levels can prevent these conditions.

Who is at risk of vitamin D deficiency?

- **People with naturally very dark skin.** The pigment in dark skin (melanin) doesn't absorb as much UV radiation, so people with naturally very dark skin may require more sun exposure for their vitamin D needs.[3]
- **People with little or no sun exposure** including:
  - housebound, hospitalised or institutionalised Australians;
  - older adults;
  - people who regularly cover up their skin (eg, for cultural reasons);
  - people who deliberately avoid sun exposure, such as those at high risk of skin cancer; and
  - people in occupations with limited sun exposure, such as night-shift workers.
- **Breast-fed babies who fall into the risk categories above or have mothers with low vitamin D**. Breast milk contains little vitamin D and infants depend on maternal stores initially (formula milk is fortified with vitamin D).[10, 11]
- **People with a disability or chronic disease** (obesity, end stage liver disease, renal disease and fat malabsorption syndromes such as cystic fibrosis, coeliac disease, inflammatory bowel disease) **or medications affecting vitamin D metabolism**.

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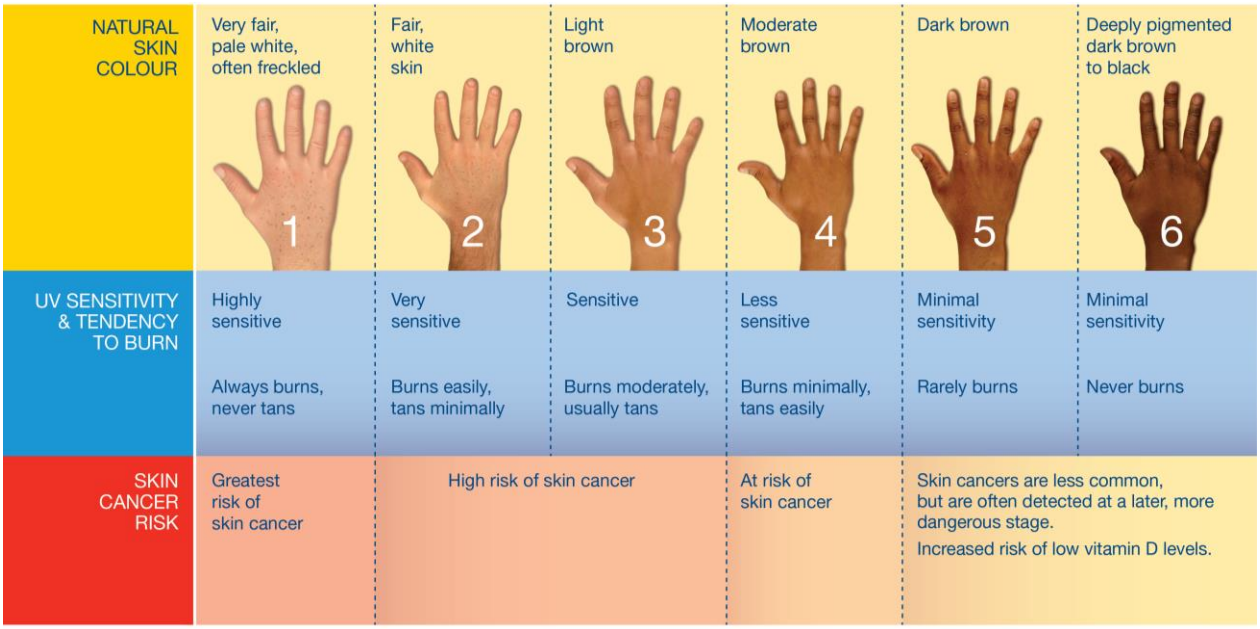

Skin Type Table adapted by SunSmart Victoria (2011) using Fitzpatrick Scale (1975). Images courtesy Cancer Research UK.

Individuals in these at-risk groups who are concerned about their vitamin D levels should speak with their doctor to determine if dietary supplementation, rather than UV exposure is appropriate. Vitamin D levels can be checked with a simple blood test.

What is considered naturally very dark skin?

All skin types can be damaged by too much UV radiation. However, individuals with naturally very dark skin (skin type 5 and 6 on Table 1) may need more sun exposure and supplementation may be required, depending on their vitamin D levels.[3,12]

Do people with naturally very dark skin need to worry about skin cancer?

Yes – care still needs to be taken in the sun. Even though skin cancer is less common for people with naturally very dark skin, those skin cancers that do occur are often detected at a later, more dangerous stage. No matter their skin type, all Victorians are at risk of eye damage from UV rays. According to the World Health Organization, UV exposure may be a factor in up to 20% of cataracts, especially in countries close to the equator, such as Australia.[13]

More information and resources

More information is available at sunsmart.com.au or contact Cancer Council Victoria on 13 11 20.

The Risks and Benefits of Sun Exposure position statement is available at cancer.org.au/vitamindposition

The SunSmart app for iPhone, iPad and Android devices is a handy, free tool that allows users to know when they do and don't need sun protection each day. It also offers vitamin D advice. Download the app at sunsmart.com.au/app

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This information is based on current available evidence at the time of review. It can be photocopied for distribution. Vitamin D information also available in other languages. Latest update: February 2016