



DELIGHTFUL D



THE SUNSHINE VITAMIN

Most essential vitamins and minerals that you require for good health come from the food and drinks you consume, as the body does not produce them or produces very little.

Vitamin D does things a little differently.

Vitamin D is produced in your skin in response to exposure to sunlight. That's why it's sometimes called the "sunshine vitamin"! But despite its vitamin title, it is a prohormone or precursor of a hormone – a substance that your body converts to a hormone.

WHAT IS VITAMIN D?

Vitamin D is a fat-soluble vitamin in a family of compounds including vitamins D1, D2, and D3. Your body converts ultraviolet (UVB) light from the sun (the best natural source of vitamin D) into the active vitamin D hormone via your skin, liver, and kidneys. Through this process, it changes form and name - being referred to as calciferol, calcifediol and calcitriol. Dietary intake provides around 20% of our vitamin D2 (plant foods) and D3 intake (meat and animal sources). When sunlight exposure and dietary intake is low, supplemental sources (calciferol or calcifediol) can be used to help raise our vitamin D levels.

What raises vitamin D levels more quickly?

Calcifediol

Increases serum vitamin D levels **rapidly within days** at lower doses



Highly absorbable



A more active form that by-passes liver conversion



Not stored in fat tissue



Unimpaired by kidney dysfunction



Lasts **15 days** in the body



Colecalciferol

Increases serum vitamin D levels **over a period of months** at higher doses

Moderate absorption rate

Requires activation by the liver

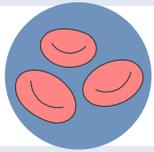
Stored in fat tissue

Can be **impaired** by kidney dysfunction

Lasts **15 hours** in the body

WHY IS VITAMIN D IMPORTANT?

Vitamin D operates as a hormone and is carried in the blood to vitamin D receptors present in almost all tissues. Vitamin D reduces inflammation and plays an important role in biological functions, including:



Promoting intestinal absorption of calcium, magnesium, and phosphorus, and regulating the levels of these minerals in your blood



Promoting normal growth & development of healthy bones and teeth



Maintaining strong bones and muscles



Facilitating normal immune system function



Supporting brain and nervous system health



Supporting cardiovascular health

VITAMIN D DEFICIENCY

Signs of vitamin D deficiency may include:

- Mood changes, like depression
- Muscle cramps, aches, or weakness
- Bone and joint pain
- Bone loss
- Fatigue
- Frequent colds and flu

Vitamin D deficiency increases the risk of developing bone abnormalities, such as:

- Rickets
- Osteomalacia (soft bones)
- Osteoporosis (fragile bones)
- Liver and thyroid complications

Given the many important roles it plays within your body, making sure you get enough vitamin D is essential to supporting your health and wellness.

THE SUNSHINE PARADOX

It's important to be mindful of your sun exposure in Australia as the continent receives higher levels of UV radiation compared to other parts of the world, such as Europe. Ozone depletion near the continent means that the Australian atmosphere has a less protective filter, increasing the population's exposure to UV rays. Coupled with a closer proximity to the sun during summer and clearer atmospheric conditions compared to other countries, this makes the Australian sun stronger and harsher on skin.

Concern about the risk of skin cancer has encouraged Australians to cover up and wear sunscreen – or avoid the sun entirely. Whilst it is necessary to take sensible precautions to protect your skin, over-

compensatory behaviour also poses a health risk from reduced vitamin D levels – as evidenced by the high levels of vitamin D deficiency in Australia.

Prevalence of vitamin D deficiency in Australia: A large retrospective case series of over 30,000 Australians found that as many as 60% of Australians have insufficient Vitamin D levels (<75 nmol/L).¹

It is necessary to have some UV exposure to produce vitamin D in your skin and maintain good health. However, if you don't want to be in the sun, you can support adequate vitamin D levels in your body through supplementation.



DIFFERENCES IN VITAMIN D

UV levels differ across Australia and throughout the year. The amount of time you need to spend in the sun for your skin to make sufficient vitamin D will vary according to personal factors (see page 9), and environmental factors:

Your location / latitude

The season

The time of day

The amount of cloud cover & air pollution

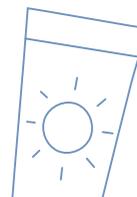
Your vitamin D levels fluctuate naturally with the seasons, varying considerably from summer to winter and requiring different levels of support. During summer in Australia, when the UV Index is 3 or above, around ten minutes of mid-morning or mid-afternoon sun exposure each day is recommended to support Vitamin D levels. When the UV Index drops below 3 in late autumn and winter, and in some southern

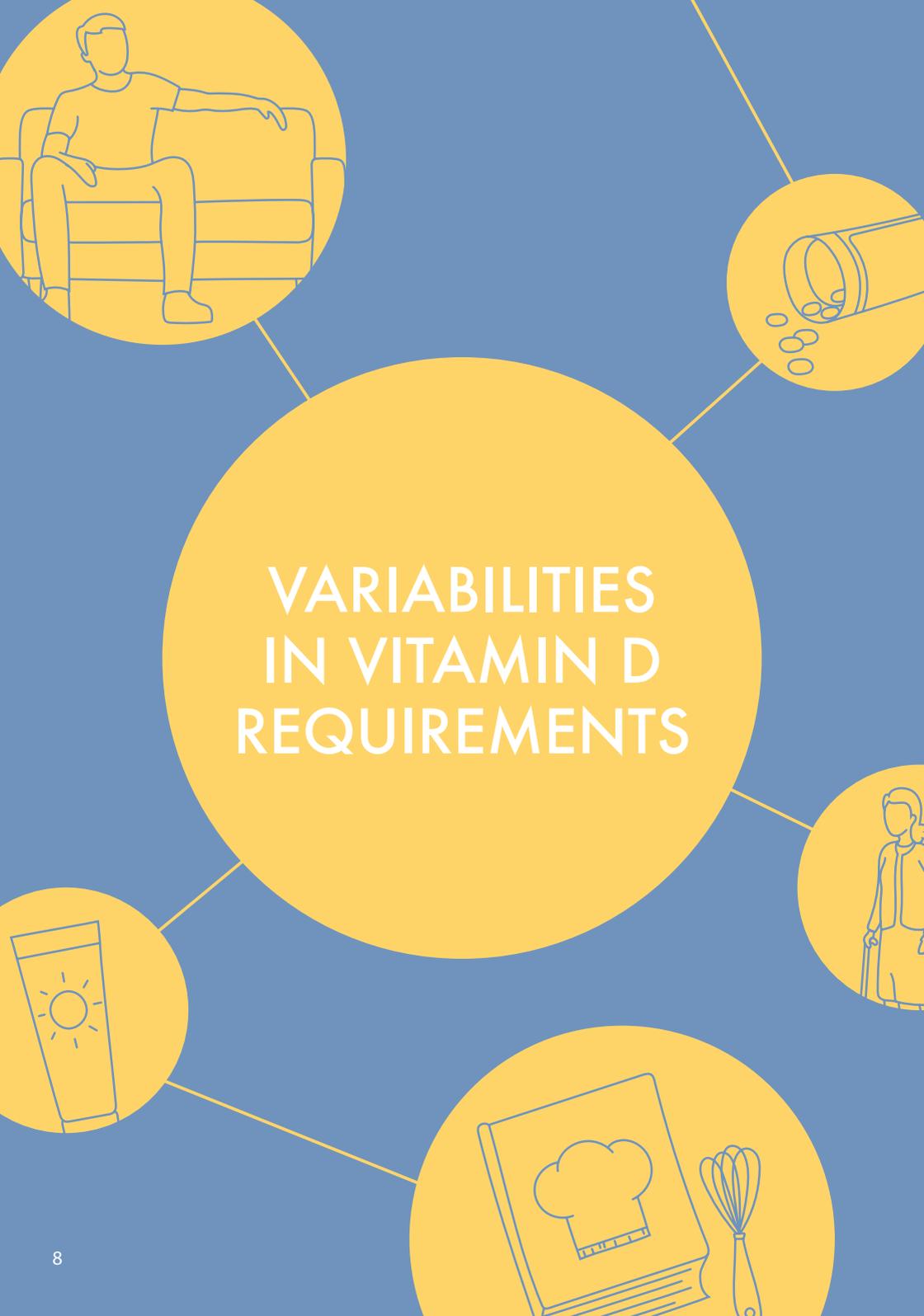
parts of Australia, spend a little longer outdoors – around 20 minutes, twice daily – with more skin uncovered, to get sufficient sun exposure.

Keep in mind that your body can only absorb a limited amount of vitamin D at a time. So, spending extra time in the sun won't necessarily increase your vitamin D levels – but it will increase the risk of skin cancer. When outdoors for more than a few minutes when UV levels are 3 or above, wear UV protection.

Interesting Fact:

Vitamin D produced in the skin may last at least **twice as long** in the blood compared with ingested vitamin D.





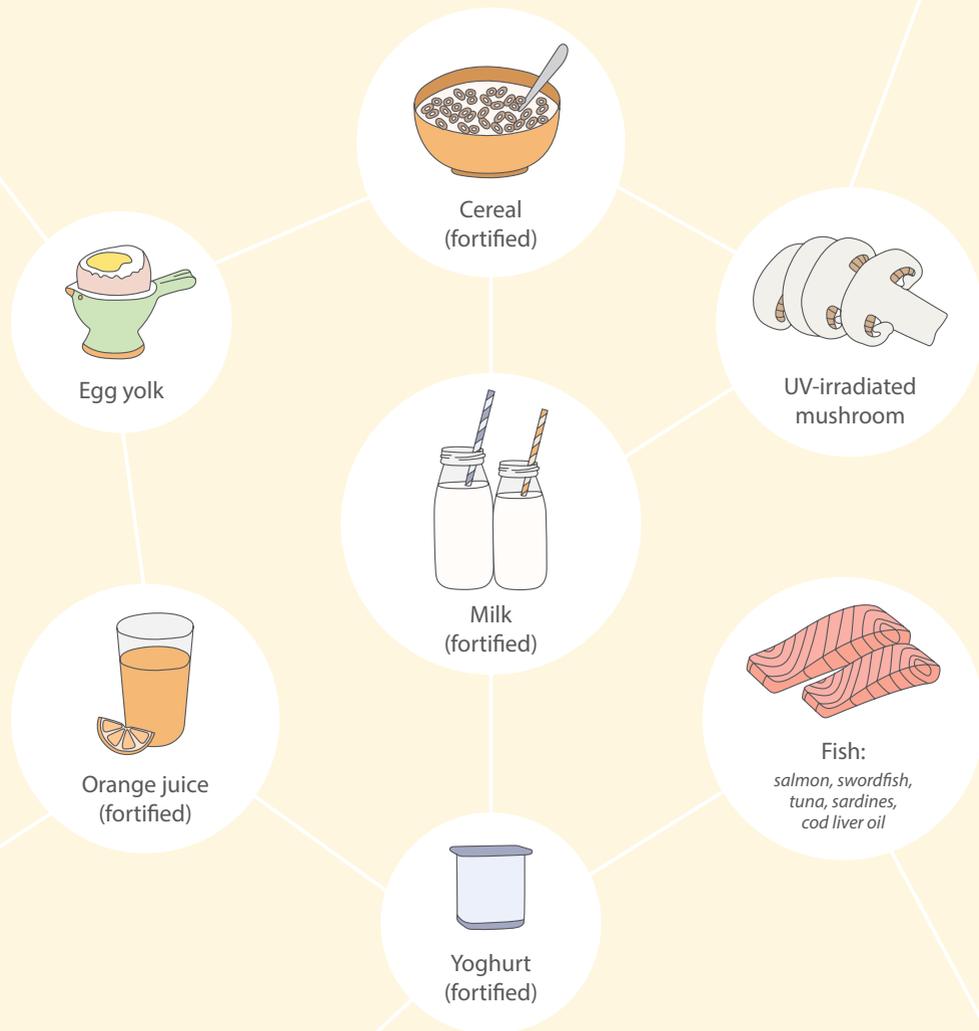
VARIABILITIES IN VITAMIN D REQUIREMENTS

People who are at greater risk of vitamin D deficiency include:

- **Those who are obese**
- **Those who wear covering or concealing clothing**
- **Breast-fed babies of vitamin D deficient mothers**
- **Those who take medication** that affects vitamin D metabolism
- **Older people:** Your skin's ability to make vitamin D reduces with age
- **Those who avoid the sun:** Due to previous skin cancers, immune suppression, or sensitive skin
- **Those who have limited sun exposure:** Such as night shift workers, office workers, and those who spend a lot of time indoors
- **Those with magnesium deficiency:** Magnesium is required for vitamin D absorption
- **Those who have a medical condition, disability or disease that affects vitamin D metabolism:** Including kidney and liver disease; coeliac disease and inflammatory bowel diseases such as Crohn's
- **Those who have naturally very dark skin:** Because the pigment (melanin) in dark skin doesn't absorb as much UV light

FOOD SOURCES OF VITAMIN D

Only small amounts of vitamin D can be found in foods, making it difficult to get enough from diet alone. Some foods are fortified, meaning that vitamin D has been added.



Disclaimer

The information in this booklet is generic in nature. Please consult your healthcare practitioner for guidance regarding your individual condition and specific symptoms, and before making any diet or lifestyle changes. Vitamin and nutrient supplementation should not replace a balanced diet. For any questions, please talk to your healthcare professional.

References available on request.