Sun protection and Vitamin D levels.

Summary:

1. Normal levels of vitamin D are essential for good health.
2. About 90% of our vitamin D production is from sun exposure, the balance comes from our diet.
3. Regular use of sunscreen or sun protective clothing does not adversely affect levels of vitamin D.
4. Just 5 minutes of sun exposure to the hands and face during summer is all that is required to maintain normal vitamin D levels.
5. Sun protection is generally not required during winter months and 20-50 minutes of sun exposure is required to maintain normal vitamin D levels.
6. Window glass blocks UVB light - the essential component to stimulate vitamin D production.
7. Ultraviolet light from the sun is the cause of most skin cancers.

The significant role of sunlight in our Vitamin D production is indisputable. About 90% of our vitamin D is produced through pathways originating in the skin after sun exposure. The remainder of our vitamin D exposure comes from our diet. Foods rich in vitamin D include oily fish, eggs and foods fortified with vitamin D (for example some milks and yogurts) and supplements. Vitamin D is essential in maintaining bone, nerve, muscle and immune health. It also has role in controlling cell proliferation, differentiation and controlled cell death (apoptosis).

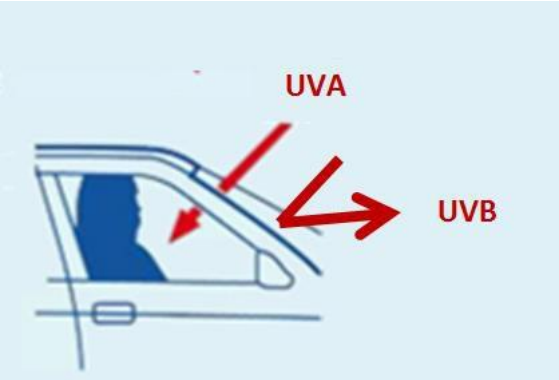
This has also been a very popular subject for newspapers, magazines and TV articles addressing the concerns of sun exposure and the risk of skin cancers and concerns about low Vitamin D levels. Unfortunately there is confusion reflected in many of these articles and they frequently present an ill founded conundrum - “sun exposure causes cancer but gives you good vitamin D levels and protecting yourself from the sun will reduce your risk of skin cancer but cause health issues because of the lack of vitamin D”. The science is clear - you can have both good sun protection and healthy Vitamin D levels. These are not competing goals.

A New Zealand study has shown that you less than 5 minutes of sun exposure to your face, neck and hands during mid-summer to maintain healthy vitamin D levels. During winter exposure time increases to 17 minutes in the upper North Island and 48 minutes in Invercargill.

It is logical and certainly possible to adversely affect Vitamin D levels with regular sun protective measures. However numerous studies have confirmed that in the “real world” regular sunscreen use or sun avoidance does not adversely affect the vitamin D levels. There are several reasons for this. Sunscreens do not completely block UV light entering the skin - about 3% of UV light still enters the skin with a sunscreen with a SPF of 30. Only small amounts of UV light are required to trigger vitamin D production. How we apply sun screen is also a factor. Generally we do not apply enough during each application. A screen with a SPF50 rating may only produce the protection of a SPF of 30 if applied too thinly. A third reason may be due to the inherent delay before protection is effective

with chemical sun screens. They take about 20-30 minutes to become effective and sun exposure during this time will generate Vitamin D.

Window glass absorbs UVB light so sun exposure through glass does not result in Vitamin D production. However UVA penetrates glass so the skin can still suffer premature aging, wrinkles, sunspots and skin cancers. This has implications for elderly at aged care facilities - they need to sit outside directly in the sun to generate Vitamin D. Professional drivers and those is offices without UV filters on the glass, should use sun protection to avoid the photo-aging and skin cancer risks associated with chronic UVA exposure.
Many clinics offer vitamin injections in order to boost the body's natural level.

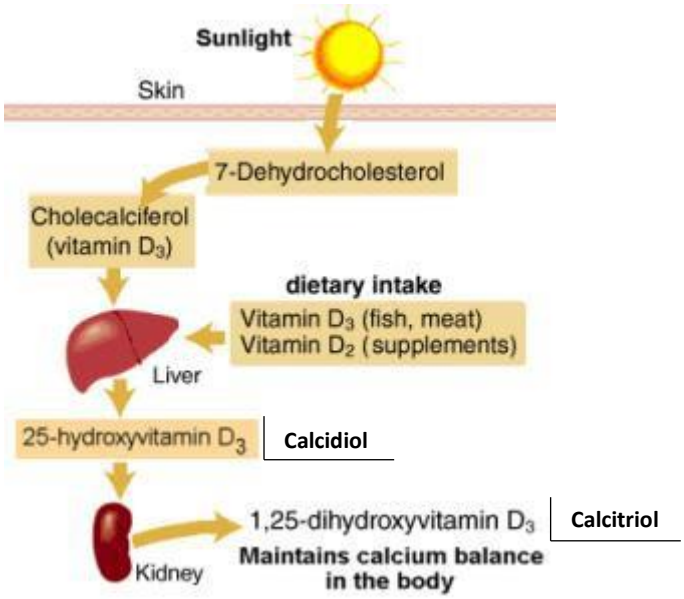


Physiological Pathway and normal levels:

Vitamin D is a fat-soluble vitamin that is naturally present in very few foods, added to others, and available as a dietary supplement. It is also produced endogenously when ultraviolet rays (UVB) from sunlight strike the **skin** and trigger vitamin D synthesis - 7-Dehdrocholesterol is converted into Vitamin D3 (Cholecalciferol). The vitamin D obtained from sun exposure, **food**, and supplements is biologically inert and must undergo two hydroxylations in the body for activation. The first occurs in the **liver** and converts vitamin D to 25-hydroxyvitamin D [25(OH)D], also known as calcidiol. The second occurs primarily in the **kidney** and forms the physiologically active 1,25-dihydroxyvitamin D [1,25$(OH)_2$D], also known as calcitriol.

The best indicator of Vitamin D status is the serum concentration of 25(OH)D. This reflects recent cutaneous production as well as dietary sources as it has a circulating half- life of 15 days. It does not reflect vitamin D stored in the tissues. Levels < 30nmol/l reflect deficiency, ≥ 50nmol/l healthy levels and > 125 nmol/L can be associated with adverse effects (anorexia, weight loss, polyuria, heart arrhythmias and calcification of bloods vessels and tissue.

Recommended daily dietary intake is 600 IU or 800 IU if over 70 years old.



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https://ods.od.nih.gov/factsheets/VitaminD-HealthProfessional/

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