

Continuing Professional  
Development

# CPD

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## 60 Second Summary

Vitamin D is sometimes called the "sunshine vitamin" because it's produced in your skin in response to sunlight. You can also get it through certain foods and supplements to ensure adequate levels of the vitamin in your blood. Vitamin D has many important functions in the body including regulating the absorption of calcium and phosphorus, and facilitating normal immune system function. Getting a sufficient amount of vitamin D is important for normal growth and development of bones and teeth, as well as improved resistance against certain diseases.

The goals of treating and preventing vitamin D deficiency are the same - to reach and keep an adequate level of vitamin D in the body. We can do this by eating more food sources that contain vitamin D. We can also increase our exposure to sunlight - but not too much. Exactly how much sun exposure is needed remains unclear, however 10 to 15 minutes of sun exposure two to three times a week to the face, arms, legs or back may be all that is needed to absorb a suitable amount of vitamin D.

Those who are older, have a darker skin colour, live in northern climates are at an increased risk of vitamin D deficiency and may need more sun exposure, particularly during the winter months.

Supplementation may also be required. The HSE currently recommends supplementation for babies 0-12 months of 5 micrograms of vitamin D3 every day from birth to 12 months if they are breastfed or taking less than 300mls or 10 fluid oz of infant formula a day. Children aged 1-4 years are also recommended to supplement 5 micrograms of vitamin D3 every day during winter. And adults aged 65 years are recommended to take 15-20 micrograms (600-800IU) of vitamin D daily.

**1. REFLECT** - Before reading this module, consider the following: Will this clinical area be relevant to my practice?

**2. IDENTIFY** - If the answer is no, I may still be interested in the area but the article may not contribute towards my continuing professional development (CPD). If the answer is yes, I should identify any knowledge gaps in the clinical area.

**3. PLAN** - If I have identified a

knowledge gap - will this article satisfy those needs - or will more reading be required?

**4. EVALUATE** - Did this article meet my learning needs - and how has my practise changed as a result? Have I identified further learning needs?

**5. WHAT NEXT** - At this time you may like to record your learning for future use or assessment. Follow the

4 previous steps, log and record your findings.

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# The Importance of Vitamin D

Vitamin D is often called the "sunshine vitamin" because it's produced in your skin in response to sunlight. It's a fat-soluble vitamin in a family of compounds that includes vitamins D-2, and D-3.

Vitamin D is unique because it can be made in the skin from exposure to sunlight. You can also get it through certain foods and supplements to ensure adequate levels of the vitamin in your blood.

Vitamin D has several important functions. Perhaps the most vital are:

## 1. Regulating the absorption of calcium and phosphorus, and facilitating normal immune system function.

- Getting a sufficient amount of vitamin D is important for normal growth and development of bones and teeth, as well as improved resistance against certain diseases.

## 2. Supporting the parathyroid glands

- These work minute to minute to balance the calcium in the blood by communicating with the kidneys, gut and skeleton. When there is sufficient calcium in the diet and sufficient active Vitamin D, dietary calcium is absorbed and put to good use throughout the body. If calcium intake is insufficient, or vitamin D is low, the parathyroid glands will 'borrow' calcium

from the skeleton in order to keep the blood calcium in the normal range.

- Vitamin D insufficiency affects almost 50% of the population worldwide. In childhood/adolescence, there are periods of intensive bone growth, with Vitamin D deficiency causing improper bone mineralisation, causing rickets. This leads to a severely bowlegged appearance due to the softening of the bones. Evidence suggests that rickets prevalence is increasing globally, with levels in the UK the highest seen in 5 decades. A recent study by Trinity College Dublin, also found that low vitamin D is highly prevalent (51%) in Ireland, with girls, those over 12 years and those assessed in winter most at risk.
  - Similarly, in adults, vitamin D deficiency manifests as osteomalacia, or softening of the bones. Osteomalacia results in poor bone density and muscular weakness. Osteoporosis (fragile bones) can also result, which can lead to increased fractures & falls particularly in the elderly.
- ## 3. Reduced risk of flu
- Vitamin D interacts with receptors on macrophages, B lymphocytes & T lymphocytes to help activate & regulate immune responses. Within the respiratory tract, it also stimulates our production of natural anti-microbial factors such as the

anti-biotic like proteins known as defensins. Studies involving over 19,000 adults show that having low levels of vitamin D increases the likelihood of developing common cold symptoms by 36% compared to people with high levels. Deficiency is especially harmful for people with lung diseases - lack of vitamin D increases the risk of respiratory infection in those with asthma & COPD.

## 4. Healthy infants

- Vitamin D deficiency has links to high blood pressure in children. A 2018 study found a possible connection between low vitamin D levels and stiffness in the arterial walls of children.
- The American Academy of Allergy Asthma and Immunology (AAAAI) suggest that evidence points to a connection between low vitamin D exposure and an increased risk of allergic sensitization. An example of this is children who live closer to the equator and have lower rates of admission to hospital for allergies plus fewer prescriptions of epinephrine autoinjectors. They are also less likely to have a peanut allergy.
- Furthermore, vitamin D may enhance the anti-inflammatory effects of glucocorticoids. This benefit makes it potentially useful as a supportive therapy for people with steroid resistant asthma.

## Causes

Vitamin D-related gene polymorphisms



Low sun exposure



Poor diet



No supplements



## Consequences

Vitamin D deficiency

Mineralisation defect

Bone loss

High PTH

## Prevention

Sun



Oily fish



Cod liver oil



Food fortification: (milk, juice, flour, oil)



Supplements for risk groups

- bone and back pain
- low mood
- impaired wound healing
- hair loss
- muscle pain

If Vitamin D deficiency continues for long periods, it may result in complications, such as:

- cardiovascular conditions
- autoimmune problems
- neurological diseases
- infections
- pregnancy complications
- certain cancers, especially breast, prostate, and colon.

### So how do we source our Vitamin D?

You can get vitamin D in a variety of ways. These can include:

- Being exposed to the sun. About 15-20 minutes three days per week is usually sufficient.
- Through the foods you eat.
- Through nutritional supplements.

### The health benefits of sunlight.

Vitamin D is produced when your skin is exposed to sunshine, or rather, the ultraviolet B (UV-B) radiation that the sun emits. The amount of vitamin D that your skin makes depends on such factors as:

- The season: This factor depends a bit on where you live. The sun may not reach northern latitudes for many months of the year.
- The time of day: The sun's rays are most powerful between 10 a.m. and 3 p.m.
- The amount of cloud cover and air pollution.
- Where you live: Cities near the equator have higher ultraviolet (UV) light levels. It is the UV-B light in sunlight that causes your skin to make vitamin D.
- The melanin content of your skin: Melanin is a brown-black pigment in the eyes, hair and skin. Melanin causes skin to tan. The darker your skin, the more sun exposure is needed in order to get sufficient vitamin D from the sun.

### Effects of diet on Vitamin D

Vitamin D doesn't occur naturally

### 5. Healthy pregnancy

- Recent studies suggest that pregnant women who are deficient in vitamin D may have a greater risk of developing preeclampsia and giving birth preterm.
- Doctors also associate poor vitamin D status with gestational diabetes and bacterial vaginosis in pregnant women.

### 6. Reduced severity of disease & death from Covid-19

- New research from Trinity College and University of Edinburgh has examined the association between vitamin D and COVID-19, and found that ambient ultraviolet B (UVB) radiation (which is key for vitamin D production in the skin) at an individual's place of residence in the weeks before COVID-19 infection, was strongly protective against severe disease and death. This suggests that vitamin D may protect against severe COVID-19 disease and death, however further research is needed before any definitive conclusions may be drawn.

Although the body can create vitamin D, a deficiency can occur for many reasons.

### Causes of Vitamin D Deficiency:

- Skin type: Darker skin, for example, and sunscreen, reduce the body's ability to absorb the ultraviolet radiation B (UVB) rays from the sun.

Absorbing sunlight is essential for the skin to produce vitamin D.

- Sunscreen: A sunscreen with a sun protection factor (SPF) of 30 can reduce the body's ability to synthesise the vitamin by 30% or more. Covering the skin with clothing can inhibit vitamin D production also.
- Geographical location: People who live in northern latitudes or areas of high pollution, work night shifts, or are homebound should aim to consume vitamin D from food sources whenever possible.
- Breastfeeding: Infants who exclusively breastfeed need a vitamin D supplement, especially if they have dark skin or have minimal sun exposure.
- Cystic fibrosis, Crohn's disease, and celiac disease: These diseases do not allow the intestines to absorb enough vitamin D through supplements.
- Weight loss surgeries. Weight loss surgeries that reduce the size of the stomach and/or bypasses part of the small intestines make it very difficult to consume sufficient quantities of certain nutrients, vitamins, and minerals. These individuals need to be carefully monitored by their doctors and need to continue to take vitamin D and other supplements throughout their lives.
- Obesity: A body mass index greater than 30 is associated with lower vitamin D levels. Fat

cells keep vitamin D isolated so that it is not released. Vitamin D deficiency is more likely in obese people. Obesity often makes it necessary to take larger doses of vitamin D supplements in order to reach and maintain normal D levels.

- Kidney and liver diseases: These diseases reduce the amount of an enzyme needed to change vitamin D to a form that is used in the body. Lack of this enzyme leads to an inadequate level of active vitamin D in the body.
- Age: The skin's ability to make vitamin D lessens with age.
- Mobility: People who are homebound or are rarely outside (for example, people in nursing homes and other facilities) are not able to use sun exposure as a source of vitamin D.
- Medications
- Laxatives
- Steroids (such as prednisolone)
- Cholesterol-lowering drugs (such as cholestyramine)
- Seizure-control drugs (such as phenobarbital and phenytoin).
- A tuberculosis drug (rifampin).
- A weight-loss drug (orlistat).

### Symptoms of vitamin D deficiency:

- regular sickness or infection
- fatigue

Food	Vitamin D content in International Units (IUs) per serving
Cod liver oil, 1 tablespoon	1360
Swordfish, cooked, 3 ounces	566
Salmon (sockeye) cooked, 3 ounces	447
Tuna, canned in water, drained, 3 ounces	154
Orange juice fortified with vitamin D, 1 cup	137
Milk, vitamin-fortified, 1 cup	115-124
Yogurt, fortified with 20% of the daily value of vitamin D, 6 ounces	80
Sardines, canned in oil, drained, 2 sardines	46
Liver, beef, cooked, 3 ounces	42
Egg yolk, 1 large	41
Cereal, fortified with 10% of the daily value of vitamin D, 1 cup	40
Cheese, Swiss, 1 ounce	6

#### Vitamin D content of various foods

#### Supplementation. How much vitamin D do we need?

Current HSE guidelines recommend the following supplementation for the various age groups:

##### Babies 0 - 12 months:

5 micrograms of vitamin D3 as a supplement every day from birth to 12 months if they are:

- breastfed
- taking less than 300mls or 10 fluid oz (ounces) of infant formula a day

All babies who are being breastfed should continue to get a vitamin D supplement after birth, even if you took vitamin D during pregnancy or while breastfeeding.

You do not need to give your baby a vitamin D supplement if they are fed more than 300mls or 10 fluid oz (ounces) of infant formula a day. This is because there has been an increase in the amount of vitamin D added to infant formula. This is due to a change in EU law as of February 2020.

#### Why babies need vitamin D

Vitamin D helps us to build and maintain strong bones and teeth.

Our bodies can make vitamin D from the sun. But babies cannot safely get the vitamin D they need from the sun.

#### Your baby needs vitamin D because:

- their skin is very sensitive to the sun and should not be in direct sunlight
- their food (breastmilk or solid foods) may not have enough vitamin D in it
- between 0 to 12 months babies grow very quickly and have a greater need for vitamin D to form strong bones

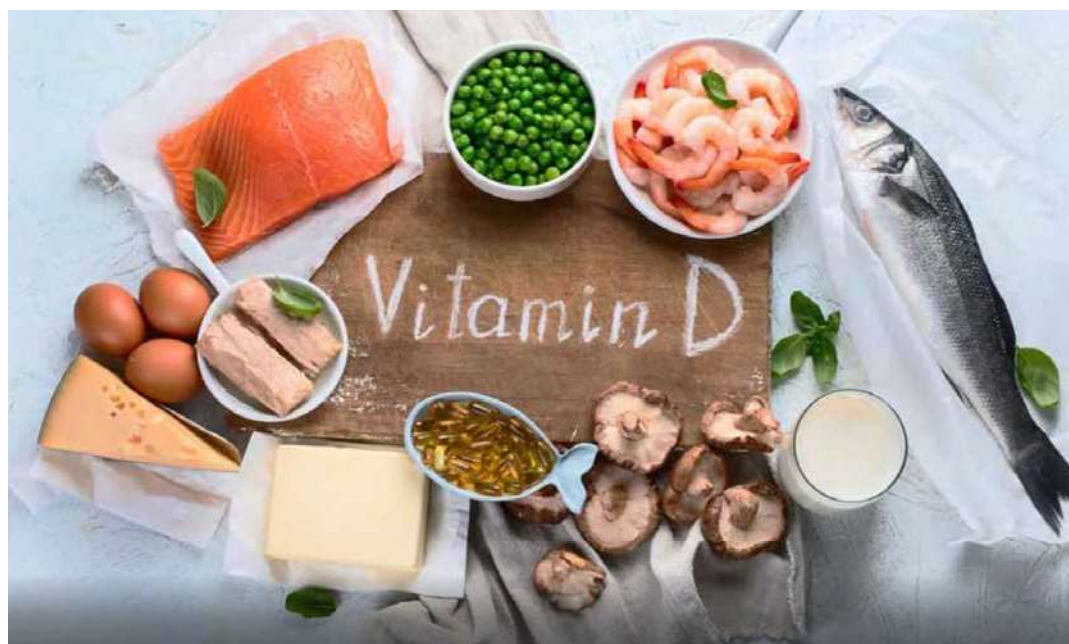
Research shows that vitamin D plays an important role in helping the immune system. It may help prevent diabetes, heart disease, rheumatoid arthritis, MS (multiple sclerosis) and some forms of cancer. African, Afro-Caribbean, Middle-Eastern or Indian parents are more likely to have babies with low levels of vitamin D.



in many foods. That's why certain foods have added vitamin D. In fact, newer food nutrition labels show the amount of vitamin D contained in a particular food item.

It may be difficult, especially for vegans or people who are lactose intolerant to get enough vitamin D from their diets, which is why some people may choose to take supplements. It is always important to eat a variety of healthy foods from all food groups. The vitamin content of various foods is shown in the table above.





### Children aged 1 - 4 years:

5 micrograms of vitamin D3 as a supplement every day during winter.

Liquid drops of a vitamin D-only supplement are usually best for children aged 1 to 4 years old. A liquid supplement is also safe. Do not give your child chewable or tablet-type supplements. These could be a choking risk.

### Older Adults aged 65 years and over:

The recommended daily intake of vitamin D in older adults in Ireland is 15 µg (600IU) for those who are generally healthy and living independently, and 20 µg (800IU) for those who are housebound with limited or no sunlight exposure.

Diets of older adults in Ireland should include regular intakes of natural sources of vitamin D, such as oily fish, eggs, meats, and vitamin D-fortified foods.

### Treatment Of Vitamin D Deficiency

The goals of treatment and prevention are to reach, and then maintain, an adequate level of vitamin D in the body. While you might consider eating more foods that contain vitamin D and getting a little bit of sunlight, you may likely be told to take vitamin D supplements..

Vitamin D comes in two forms: D2 and D3. D2, also called ergocalciferol, comes from plants.

D3, also called cholecalciferol, comes from animals. You need a prescription to get D2. D3, however, is available over the counter. It is more easily absorbed than D2 and lasts longer in the body dose-for-dose.

### Can you ever have too much vitamin D?

Yes. You can get too much vitamin D if you overdo the supplements. Interestingly, you cannot get too much vitamin D from the sun. Vitamin D toxicity is, thankfully, quite rare but can lead to hypercalcemia and together the symptoms can include:

- Nausea.
- Increased thirst and urination.
- Poor appetite.
- Constipation.
- Weakness.
- Confusion.
- Ataxia (a neurological condition that may cause slurring of words and stumbling).

Do not take higher-than-recommended doses of vitamin D without first discussing it with your GP. However, your GP might recommend higher doses of vitamin D if he or she is checking your blood levels and adjusting your dose accordingly. Also, be cautious about getting large doses of vitamin A along with the D in some fish oils. Vitamin A can also reach toxic levels and can cause serious problems.

### Prevention

The goals of treating and preventing the lack of vitamin D of treatment and prevention are the same—to reach and keep an adequate level of vitamin D in the body.

Here is where we as pharmacists, and pharmacy teams have an important role to play. We are uniquely positioned at the heart of the communities we serve. We are also held in very high regard by our local communities - as only recently seen in the Ipsos MRBI poll where we were voted the Most Trustworthy Profession in Ireland for the second year in a row. Our local communities recognise pharmacies as being the go to for reliable, personal & professional advice. Counselling, education, and offering support to our patients are at the core of what we do. As one of the most accessible healthcare resources in Ireland, we are ideally placed to offer advice & guidance to our customers on vitamin D & its supplementation and therefore

empower them to look after their own health and wellbeing.

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# New Study on Epilepsy

A new study which monitored the outcome and uptake of Covid-19 vaccines in people with epilepsy has recently been published in epilepsy medical journal, Epilepsia.

The study assessed data collected from three medical centres across China from July 24th – August 31st 2021.

In total, 981 people were recruited for this study and were interviewed using questionnaires to collect & assess data surrounding their reasons for taking or not taking the vaccine and to assess the outcome of the vaccine on those taking part.

Of the 981 people recruited, 491 people had epilepsy; 217 had other neuropsychiatric conditions and 273 had no underlying conditions.

The questionnaire presented to participants with epilepsy sought to learn more about their condition, seizure control and reasons for hesitation around

vaccination. This way their condition pre & post vaccination could be monitored and assessed.

Data was collected from healthy controls to compare this with the data with those with epilepsy to see whether there was an increased report of side-effects amongst people with epilepsy and to learn more about hesitancy around vaccination.

When this data was collected and assessed, the authors of the research have made two key conclusions:

1. The data collected from people with epilepsy has found no evidence suggesting worsening seizure control post-vaccination; with less than 10% reporting an increase in seizures post vaccination. However,

for this cohort of people who reported an increase in seizures, the study's authors speculate that this may have been coincidental and owing to the fluctuating nature of epilepsy rather than any post-vaccination side-effects.

2. Vaccination rates amongst people with epilepsy were much lower than their "healthy" controls. At the time of the study, 93% of healthy controls had been administered with a first dose of a vaccine, compared to 42% of those with epilepsy. People with epilepsy cited hesitance around vaccination due to potential loss of seizure control/increase in seizure frequency and concerns around potential adverse side-effects of vaccination.

Alongside the above two key findings, no incidences of status epilepticus amongst those with epilepsy was recorded while reports of adverse side-effects (pain at injection site, fatigue, headache, fever etc) were not increased in people with epilepsy when compared with "healthy" controls.

The findings of this study are very welcome as this represents the first wide-scale study on the use of COVID-19 vaccines in people with epilepsy.

You can read this study in full by visiting the Epilepsia website at the link below:

<https://onlinelibrary.wiley.com/doi/10.1111/epi.17138>



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Further prescribing information is available on request from Neuraxpharm or the Summary of Product Characteristics – eMail: [medinfo@neuraxpharm.com](mailto:medinfo@neuraxpharm.com) or Tel.: +353 (1) 4688 202  
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