

THE CASE FOR OPTIMUM VITAMIN **D**

**WHY YOU SHOULD
SUPPLEMENT**

*"I believe vitamin D is the number one public health advance
in medicine in the last twenty years."*

Dr John Whitcomb,
Aurora Sinai Medical Centre

by **Paul Clayton** and **Colin Rose**

The authors



Dr Paul Clayton graduated summa cum laude in Medical Pharmacology from Edinburgh University, prior to obtaining his PhD.

He is a former Senior Scientific Advisor to the UK government's Committee on the Safety of Medicines and a past President of the Forum on Food and Health at the Royal Society of Medicine.

Dr Clayton frequently presents at and chairs international conferences on nutrition and health. He is a Fellow of the Institute of Food, Brain & Behaviour, Oxford, and a visiting professor of Pharmaco-Nutrition at Pecs University, Hungary.



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A founder member of the UK Campaign for Learning, he is also a member of the Royal Society of Medicine and a Fellow of The Royal Society of Arts.

e-book first published 2016

by Accelerated Learning Systems Ltd
Aylesbury, Bucks, UK

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Why you should read this report

*“Because vitamin D so clearly reduces all-cause mortality,
I can say this with great certainty: Vitamin D
represents the single most cost-effective
medical intervention”.*

**Dr Greg Plotnikoff, Medical Director,
Penny George Institute for Health and Healing**

Scientific medical research shows that **optimal** levels of Vitamin D have the potential to:

- Reduce the risk of many cancers
- Lower the risk of dementia
- Reduce asthma symptoms
- Reduce the risk of bone fractures
- ... and even increase life span

Yet, according to the leading vitamin D researchers, the majority of us have well below optimum levels of vitamin D in the blood and a significant percentage fail to reach even the Recommended Daily Allowance which experts are now labelling as inadequate.

The NHS recognised in July 2016 the importance of vitamin D and recommends:

“Adults and children over the age of one should consider taking a daily supplement containing 10mcg of vitamin D, particularly during autumn and winter. Those with a higher risk of vitamin D deficiency are being advised to take a supplement all year round.”

However, a huge weight of evidence shows that just *avoiding deficiency* with ‘adequate’ levels of vitamin D is not enough – and that reaching *optimum* blood levels of vitamin D can confer major health benefits.

Unfortunately there is a confusion of what constitutes ‘adequate’ and ‘optimum’ levels. Indeed the UK is in the unhappy position of having an official Reference Nutrient Intake/Recommended Daily Amount that is half the latest recommendation from Public Health England and a third of the new US RDA levels!

This report aims to give you the evidence to make a considered decision on whether you need to supplement with vitamin D – you almost certainly do – and how much is both safe and optimum.



CHAPTER 1

WHY WE ARE DEFICIENT IN VITAMIN D

“We estimate that vitamin D deficiency is the most common medical condition in the world.”

Dr Michael F Holick, Professor of Medicine, Physiology and Biophysics,
Boston University School of Medicine

As at mid-2016 there are over 35,000 published studies on the effects of vitamin D.

Specialists in the Vitamin D research field agree that you should supplement with vitamin D – especially in the winter. The form should be vitamin **D3** – cholecalciferol – the natural form you make in response to sunlight, not the artificial form D2 which is less well utilised.

The reasons for supplementation are that:

- Low dietary intakes and sun-avoidance make D depletion very common indeed, and the situation is even worse in older age groups, as the ability of the skin to make vitamin D declines with age – which is why the US RDA for the over 70s is higher.
- It's very difficult to reach the level of vitamin D from food sources alone, as very few foods contain vitamin D. Milk is fortified with some vitamin D, which is one reason why rickets is now almost unknown, but main food sources include oily fish like salmon, mackerel, sardines and to a lesser extent eggs.
- For most people, sunlight is the main source of vitamin D, but in the northern hemisphere (UK, Europe, North America) in winter, very few occupations allow enough exposure to produce levels that are optimally health protective. Even in summer the risk of skin cancer through over-exposure causes many people to either cover up or to use high factor sunscreens.
- **Most** people are below the optimum level in winter, and the risk of deficiency is increased further for people with darker skin (for whom more exposure is needed to make the same amount of vitamin D through sunlight), for people with whole body covering and for the housebound. Obese people have lower blood levels of vitamin D because more is stored in fat tissue and unavailable in circulating blood.

This table shows how big a gap there is between even the current UK average dietary intakes of vitamin D and the RDAs, let alone the vitamin D levels that experts in the field recommend.

The average intakes in USA are somewhat higher, but still well below their own RDAs. We'll explain how we have calculated the optimum vitamin D supplementation level shortly.

Note: Vitamin D in food or in supplements is measured as either International Units (IU) or micrograms (mcg or µg). There are 40 IU in 1 mcg. RDA stands for Recommended Daily Amount, also referred to as RNI (Reference Nutrient Intake).

	Men		Women	
Average UK daily vitamin D intake from food alone	148 IU	3.7 mcg	112 IU	2.8 mcg
UK/EU Reference Nutrient Intake (RNI)	200 IU		5 mcg	
UK NHS recommendations July 2016	400 IU		10 mcg	
USA Recommended Daily Amount up to 70 (Food and Nutrition Board)	600 IU		15 mcg	
USA Recommended Daily Amount over 70	800 IU		20 mcg	
Optimum Recommended Daily Supplement Level based on leading expert research outlined in this report	WINTER	2,500 IU	62.5 mcg	
	SUMMER	800 IU	20 mcg	

The expert supplement recommendations recognise that vitamin D's role in health goes far beyond maintaining healthy bones and preventing osteoporosis.

But how much is enough? And how much is too much? Vitamin D is fat soluble, which means it is mostly retained by the body rather than any excess being excreted as it the case of vitamin C, so it is possible to take too much.

Unfortunately it's not easy to follow the research without understanding some definitions.

We will then give you the highlights of many thousands of studies.

SOME DEFINITIONS

Vitamin D in food or in supplements is measured in either International Units (**IU**) or micrograms (**mcg** or **µg**). There are 40 IU in 1 mcg.

The concentration of activated vitamin D (also known as calcidiol) in the blood is what really matters, however, and is the best indicator of your vitamin D status. This is measured in nanograms per millilitre (**ng/ml**) or nanomoles per litre (**nmol/l**) of blood.

The relationship between ng/ml of vitamin D-calcidiol in the blood and the IU of vitamin D consumed in foods and supplements is not a simple one. However, it has been calculated by the Vitamin D Council (a non-profit scientific advisory organisation in the USA) – see table.

There is a consensus amongst the experts we quote in this report that a **vitamin D-calcidiol blood level below 20 ng/ml (50 nmol/l) means you are deficient.**

On average they recommend you need to get to a blood level of **35 ng/ml** – and to get to that level (from an average starting point of 15 ng/ml or 37.5 nmol/l) indicates a supplement level of 2,500 IU in winter and somewhat less in summer.

NOTE: In the interest of readability, we will refer to the activated vitamin D in the blood as vitamin D-calcidiol, as distinct from simply vitamin D for what is in food and supplements.

Blood levels of vitamin D-calcidiol related to supplementation levels

[assuming start level is 15 ng/ml (37.5 nmol/l)]

Vitamin D Council

To achieve this blood level ...		Take this level of vitamin D3 supplement per day ...	Equivalent in mcg
20 ng/ml	50 nmol/l	500 IU	12.5 mcg
30 ng/ml	75 nmol/l	1,700 IU	42.5 mcg
40 ng/ml	100 nmol/l	3,200 IU	80.0 mcg
50 ng/ml	125 nmol/l	4,900 IU	122.5 mcg
so to reach 35 ng/ml or 87.5 nmol/l		suggests 2,500 IU	62.5 mcg

Blood tests

Having a blood test to measure the amount of vitamin D in your blood is the only certain way to know if you're getting enough vitamin D or not. The blood test you need, which measures the 25(OH)D or calcidiol is called a 25(OH)D blood test.

You can get a blood test at your doctor's or go to a clinic. In-home testing kits are also available, which are easy to use and involve pricking your finger to take a small blood sample and sending this away to a laboratory.

More about the activation of vitamin D in the body

Vitamin D obtained from sun exposure, food, and supplements is initially biologically inert. It must undergo two chemical processes 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**. That's what the blood test measures

The second occurs primarily in the kidney and forms the physiologically active 1,25-dihydroxyvitamin D [1,25(OH)₂D], also known as **calcitriol**.

CHAPTER 2

HEALTH THREATS AND BENEFITS

“No other method to prevent cancer has been identified that has such a powerful impact.”

Dr Cedric Garland, Department of Family and Preventive Medicine,
University of California Los Angeles

Of the over 35,000 published studies on the effects of vitamin D, more than 850 references show vitamin D's effectiveness against one threat alone – cancer.

For full references to the articles quoted, and others, please refer to the References section at the end, cited by chapter and subject.

HEALTH THREATS FROM VITAMIN D DEFICIENCY

Research shows that Vitamin D deficiency:

- increases your risk of auto-immune disease, and hypertension and heart problems (Dr Michael Holick, Boston University School of Medicine)
- is associated with more severe strokes (American Stroke Association) and poorer outcomes in patients who have had a stroke.
- is associated with an increased risk for over a dozen different cancers, including breast and colon cancer.
- is linked to an increase in risk of Type 1 diabetes in children whose mothers were vitamin D deficient.
- is a predictor of hardening of the arteries in middle age for those who were low in vitamin D during childhood.

HEALTH BENEFITS FROM OPTIMUM VITAMIN D STATUS

On the positive side, people who have optimum levels of Vitamin D benefit from:

Improved DNA repair and positive gene expression

- Research by Dr Michael Holick and reported in his book *The Vitamin D Solution* shows that supplementing with 2,000 IU of vitamin D per day for 4 months up-regulated dozens of different genes that control important metabolic processes. This included improved DNA repair, which has implications for slower ageing and reduced cancer risk.

Increased brain health and reduced risk of Alzheimer's

There are vitamin D receptors in many areas of the brain, especially in the hippocampus and cortex, respectively critical for memory and higher order thinking. And neurons respond positively when activated by vitamin D.

- A study at Exeter University found that severe vitamin D deficiency correlated with a 100% increase in Alzheimer's risk [meaning that risk was doubled].
- Another US study produced similar findings and in 2014 a study in the journal *Neurology* confirmed that "vitamin D deficiency is associated with a substantially increased risk of all-cause dementia and Alzheimer's disease".

The mechanisms are not yet clear, but since vitamin D is a key nutrient for the immune system, some of the beneficial effects on the brain may come from its role in enhancing the immune system and in reducing inflammation – which is a known element in Alzheimer's and dementia.

Reduced cancer risk

- Dr Cedric Garland, of the *University of California San Diego School of Medicine*, calculates that raising the minimum year-round blood levels of vitamin D-calcidiol (to between 40 and 60 ng/ml) would prevent approximately 58,000 new cases of breast cancer and 49,000 new cases of colorectal cancer in the USA and Canada each year.
- The Canadian Cancer Society recommends vitamin D supplementation following a study published in the *American Journal of Clinical Nutrition* showing that increasing vitamin D intake could potentially halve cancer risk.

- Research by Joan Lappe and Robert Heaney found that when menopausal women were given enough vitamin D to raise blood levels of vitamin D-calcidiol to 40ng/ml they had a 77% lower risk of all cancers after 4 years of supplementation.
- A report in *Anticancer Research* in 2011 found that a vitamin D-calcidiol level of 47ng/ml was associated with a 50% lower risk of breast cancer, although other studies have not found such a clear connection.
- Perhaps the clearest evidence for the ability of vitamin D to lower the risk of cancer is in colon and rectal cancers. The huge-scale *Nurses' Health and Health Professionals* studies found that those with an average blood level of vitamin D-calcidiol of 40ng/ml had a 34% lower risk than those with the lowest average of 18ng/ml.
- Finally a report in *Clinical Oncology* noted that patients with colorectal cancer had a median vitamin D-calcidiol level of 17ng/ml and concluded that anything below 20ng/ml can be considered a serious deficiency state.

Vitamin D is a hormone as well as a vitamin and is a powerful agent for regulating normal cell growth, so its potential role in cancer prevention is logical. Indeed there are many population studies that show that higher levels of vitamin D in the blood are related to lower cancer levels.

Reduced asthma symptoms

Over 5.4 million people in the UK alone, including 1.5 million children, suffer asthma and there are 1,400 asthma-related deaths every year.

- A report in the *Journal of Allergy and Clinical Immunology* shows that vitamin D can significantly improve symptoms in asthma sufferers. Researchers from Kings College, London found that vitamin D3 works better than steroids at reducing levels of a chemical in the body (called IL-17A), which aggravates symptoms in asthma sufferers. It appears as though asthma sufferers may be able to at least reduce their steroid intakes.
- Professor Adrian Martineau is the lead researcher at the *Asthma UK Centre for Applied Research, Queen Mary University of London*. Commenting on a double blind study, when one group added 1,000 to 2,000 IU of vitamin D to their normal medication while the second group took a placebo, he said: "We found that taking a vitamin D supplement in addition to standard asthma treatment significantly reduced the risk of severe asthma attacks without causing side effects." It is not yet clear whether the beneficial effects applied to all patients or just those with low starting levels of vitamin D.

Reduced hypertension (high blood pressure)

Since vitamin D is involved in the production of another hormone (renin) which in turn is involved in regulating blood pressure, it could be expected that optimum levels of vitamin D may help lower blood pressure.

- Results from the American *National Health and Nutrition Examination Survey (NHANES)* do indeed show that people with the lowest blood levels of vitamin D-calcidiol (under 15ng/ml) have an increased risk of higher blood pressure.
- This might be expected to translate into lower levels of heart disease. A 2008 study published in *Circulation* magazine showed that people with a vitamin D-calcidiol blood level of 15ng/ml had a 60% extra risk of heart disease.

Other studies have failed to find such a clear correlation, which is not surprising as heart disease has several causes – of which chronic sub-clinical inflammation in tissues is almost certainly the key.

So dosing with a single vitamin is unlikely to be anywhere near as effective as supplementing with a range of anti-inflammatory nutrients combined with a Mediterranean style diet and activity levels.

Reduced health costs and increased life expectancy

- Dr William Grant, of the non-profit organisation *Sunlight, Nutrition and Health Research Center* has been researching vitamin D for more than 25 years. He believes – as most researchers in the field do – that the current RDA recommendations are too low and that high doses (3,000 to 4,000 IU a day) can reduce the economic burden of disease in Western developed countries by about 10 percent. Applied to the UK National Health Service, that would be an annual saving of £12 billion!

In the *European Journal of Clinical Nutrition*, he estimated that doubling blood levels of vitamin D around the world would increase life expectancy by two years on average.

Reduced risk of Type 1 diabetes

- A study conducted in Finland, where children in the 1960s received 2,000 IU of vitamin D a day during the first year of life and were followed for 31 years, showed that they reduced their risk of developing Type 1 diabetes by 88%.

Bone Health

- Dr Robert Heaney of the *Osteoporosis Research Center*, Creighton University, Omaha, concluded that a blood level of 30ng/ml vitamin D-calcidiol (which is deemed acceptable by many doctors today) is actually at the bottom of the range needed for skeletal health. The *International Osteoporosis Foundation* concurs and states that people with limited sun exposure or absorption problems may need as much as 2,000 IU a day.

Depression, Mood and Seasonal Affective Disorder (SAD)

- Research on Vitamin D and depression by the Vitamin D Council found a correlation between low levels of vitamin D and depression, but was unable to say whether low vitamin D status was a causal factor in depression or a result.
- However, one double-blind randomised trial – the gold standard in research – published in the *Journal of Internal Medicine* in 2008 concluded that: “There appears to be a relation between serum levels of 25(OH)D and symptoms of depression. Supplementation with high doses of vitamin D seems to ameliorate these symptoms indicating a possible causal relationship.”
- Vitamin D deficiency is certainly associated with Seasonal Affective Disorder (SAD), a form of depression that usually begins in the autumn and continues throughout the winter months. SAD affects almost 10% of the population, more women than men and normally starts in early adulthood. Symptoms include feeling sad or anxious, fatigue, concentration problems, and irritability.

A new study led by researchers from the University of Georgia does identify low vitamin D levels with greater risk of Seasonal Affective Disorder. Co-author Michael Kimlin points out that vitamin D plays a part in the production of both dopamine and serotonin, noting that past research has associated low levels of these neurotransmitters with depression.

“Therefore, it is logical that there may be a relationship between low levels of vitamin D and depressive symptoms.”

Reduced infections

Vitamin D helps regulate the expression of genes that affect your immune system and its ability to fight bacterial and viral pathogens. So it's an important supplement in the flu season.

- Several studies, including a Yale study published in 2010, have found that supplement levels varying from 600 IU to 1,200 IU to 2,000 IU a day reduce the risk of colds and flu in the winter.

Faster recovery after muscular injury

- A recent report in the journal *Nutrients* showed faster recovery of muscle strength after injury.

Reduced risk of falls in the elderly

Since skeletal muscle needs vitamin D, as well as calcium and magnesium, it's logical that deficiency can weaken muscles.

- Studies have indeed shown that supplementing with vitamin D can decrease the risk of falls by an average of 50%. The minimum blood level to aim for appears to be at least 30ng/ml vitamin D-calcidiol.

CHAPTER 3

CONCLUSIONS

“I would challenge anyone to find a nutrient or any factor that has such consistent anti-cancer benefits as vitamin D. The data are really quite remarkable.”

**Dr Edward Giovannucci, Professor of Nutrition and Epidemiology,
Harvard School of Public Health**

To give a historical context, our hunter-gatherer ancestors spent a good deal of time outdoors and during the summer months made, in their skin, up to 20,000 IU of vitamin D a day.

So it is clear that our bodies adapted to far higher levels of vitamin D than most of us experience today. We have limited our sun exposure, and cultural or religious factors can make this limitation even more acute.

Ageing and obesity are also important, as they reduce the ability of the skin to make vitamin D by up to 75%; and a number of drugs (including anticonvulsants, the anti-inflammatory corticosteroids, and cholestyramine), are also linked to lower blood levels of vitamin D-calcidiol.

There is a wide variety of advice on what vitamin D supplement levels prevent deficiency or protect against disease – from a minimum of 400 IU to as much as 5,000 IU!

Here are some of the recommendations from health bodies and leading researchers:

The USA’s Endocrine Society, Vitamin D Council and Institute of Medicine

- **A blood level of up to 20 ng/ml vitamin D-calcidiol indicates you are deficient in vitamin D.**

With vitamin D levels in this range you’re more likely to develop osteoporosis and your bones may be affected because your body isn’t absorbing enough calcium. You’re more likely to fracture or break bones and more likely to have a fall.

Consensus Statement from the UK’s Cancer Research UK, Diabetes UK, Multiple Sclerosis Society, National Heart Forum, National Osteoporosis Society, British Association of Dermatologists and Primary Care Dermatology Society

- **Those at risk of low sun exposure should take a 10 mcg / 400 IU supplement of vitamin D a day** (7 mcg a day for children aged 6 months to 5 years). However, this implies a blood level of vitamin D-calcidiol of slightly below 20ng/ml.

Dr Walter Willett, Department of Nutrition, Harvard School of Public Health

After analysing 20 clinical trials on vitamin D and the effect on preventing fractures and falls, he concludes that blood levels of 30 to 44 ng/ml vitamin D-calcidiol provide optimal benefits, without increasing health risks.

- “These levels can be best obtained with **oral doses in the range of 1,800 to 4,000 IU vitamin D per day.**”

Dr Cedric Garland, University of California San Diego School of Medicine

- Optimum level of 40-60 ng/ml vitamin D-calcidiol, implying **3,000 to 6,000 IU of vitamin D supplements.**

Dr William Grant, Sunlight, Nutrition and Health Research Center

- Suggests **3,000 to 4,000 IU a day.**

Dr Robert Heaney, for the Osteoporosis Research Center

After researching Vitamin D for decades, he concluded that a blood level of at least 30 ng/ml of vitamin D-calcidiol is needed.

- Implies a **supplement level of 1,700 IU of Vitamin D per day.**

Dr Heaney has stated that the term “deficiency” for nutrients such as vitamin D doesn’t necessarily mean a clinical disease state, but an increased risk for certain diseases, such as osteoporosis, cancer, infections, diabetes, hypertension and cardiovascular disease. People who are seemingly healthy may really be “deficient.”

University of California Berkeley

They produced an excellent report on Vitamin D, which concludes that: “Unless you’ve been tested and know that your (blood) vitamin D level is adequate—at least 20 ng/ml vitamin D-calcidiol, though we think 30 ng/ml is a better target—consider taking a supplement.”

- They conclude that a supplement level of **1,000 IU may be enough** for many people, although ‘**your healthcare provider may advise a higher dose (usually 1,000 to 3,000 IU)**’.

SUMMARY OF EXPERT OPINION

Although there are significant variations in the expert advice above, it is possible to summarise as follows:

Deficient level	Optimal level	<u>WINTER</u> supplement level to get to 35 ng/ml	<u>SUMMER</u> supplement level to get to 35 ng/ml	Higher levels recommended and safe
Less than 20 ng/ml	30 – 40 ng/ml say 35 ng/ml	2,500 IU (62.5 mcg)	800 IU (20 mcg)	4,000 IU (100 mcg)

What is the safe level?

At the heart of medicine is the advice to ‘*Do no harm*’, and we are very mindful of this axiom. Too much vitamin D can cause an abnormally high blood calcium level, which could result in confusion, abnormal heart rhythm, nausea, constipation, and even kidney stones. A lot more is not necessarily better.

The American Heart Association issued a warning in 2012 that blood levels of vitamin D over 100ng/ml could result in a risk of atrial fibrillation and palpitations. To get to those levels, however, you would need to be taking almost 10,000IU or 250mcg of vitamin D a day – 4 times our recommendation. The risk of atrial fibrillation is associated with a deficiency in magnesium – which is a vital mineral for heart health.

The European Food Safety Authority have recently published new guidance on the upper tolerable levels for vitamin D, which suggests that adults should not exceed 4,000 IU (100 mcg) per day as there is “no evidence for safety above this level”.

The UK NHS states: “Do not take more than 100 mcg (4,000 IU) of vitamin D a day, as it could be harmful. This applies to adults, including pregnant and breastfeeding women and the elderly, and children aged 11-17 years. Children aged 1-10 years should not have more than 50 mcg a day (2,000 IU)”.

The US National Institutes of Health agrees with an Upper Safe Limit of: “4,000 IU/day for children 9 years and older, and adults, including pregnant and lactating women.”

In the interest of balance, however, we should note that Doctors Heaney and Holick (see above) carried out a study in 2002 and in Michael Holick’s words showed ...

“... that you can take up to 10,000 IU of vitamin D a day for almost a half a year and not worry about vitamin D intoxication”.

CHAPTER 4

RECOMMENDATIONS

First a caveat – vitamin D is not a magic bullet!

Before we reach our own conclusion on the optimum level, it's important to note a serious point about health research. Human lifestyles are very varied – which makes research on isolated nutrients incredibly difficult to interpret.

Vitamin D on its own is not going to magically transform anyone's health. And despite clear evidence that low vitamin D levels are linked to a wide range of life-threatening diseases, it's quite probable that low vitamin D status is also a marker for a generally unhealthy lifestyle – lack of physical activity, overweight and poor diet.

OUR FINAL RECOMMENDATION

So finally – and bearing in mind the caveat above and some conflicting expert advice – what level of vitamin D should you aim for?

Our recommendation for vitamin D supplementation, allowing for normal dietary and sunshine sources, is as follows:

	Recommended total daily D3 supplement level in WINTER	Recommended total daily D3 supplement level in SUMMER
Children over 10 <i>and</i> Young adults under 20	1,000 IU 25 mcg	400 IU 10 mcg
Adults with outdoor occupations	1,000 IU 25 mcg	800 IU 20 mcg
All other adults	2,500 IU 62.5 mcg	800 IU 20 mcg

IMPORTANT NOTE: Many people will already be taking an A-Z supplement. These will normally include vitamin D at a level of between 200 and 400 IU. Other supplements like NutriShield may contain up to 800 IU of vitamin D3.

Therefore an **ADDITIONAL daily supplement of 2,000 IU** of vitamin D3 is ideal and safe.

Children of over 10 years and young adults up to 20 could take a supplement of 1,000 IU a day or 2,000 IU every other day.

Cancer patients are at even greater risk of Vitamin D depletion as chemotherapeutic drugs may cause photosensitivity reactions and malabsorption of many nutrients. The literature supports a supplement level of at least 5,000 IU a day in this case, although ONLY under an oncologist's guidance.

A NOTE ABOUT THE IMPORTANCE OF COMBINING NUTRIENTS

However persuasive the case for vitamin D supplementation is, there are many other nutrients with excellent substantiation for health support and disease prevention, including curcumin and Omega 3; so it's the combination of foods and supplements that has the biggest impact on health. It would be a mistake to rely on Vitamin D alone.

For this reason, Dr Paul Clayton designed the comprehensive health supplement called NutriShield, which contains not just vitamins and minerals, but Omega 3, curcumin, anti-inflammatory polyphenols (derived from fruits and vegetables), lycopene, lutein, vitamin K2 and more. It already contains 800 IU of vitamin D3.

As outlined above, an additional 2,000 IU a day in winter is safe and indicated by the research for all adults, and is even more important for older people and those with darker skins.

See www.nutrishield.com for over 50s

www.nutrishield.com/essentials for younger adults

Appendices 1 to 3 which follow give details of these comprehensive daily supplements for all-year nutritional health support.

APPENDIX 1

Dr Clayton's recommended supplement formula for ages 20 to 50 is **NUTRISHIELD ESSENTIALS**

www.nutrishield.com/essentials

Nutrient	Level	Function
Omega 3	650 mg	Anti-inflammatory, heart health
Green tea extract	150 mg	Anti-inflammatory & anti-oxidant
Curcumin	250 mg	Anti-inflammatory & anti-oxidant
Grapeseed extract	100 mg	Anti-inflammatory & anti-oxidant
Vitamin C	500 mg	Anti-inflammatory & anti-oxidant
Natural Vitamin E	55 mg/83IU	Anti-inflammatory & anti-oxidant
Vitamin K1	50 mcg	Anti-inflammatory at high doses. K2 is the most potent form
Vitamin K2	25 mcg	
Vitamin D3	20 mcg/800IU	Important immune system support
Selenium	150 mcg	Anti-inflammatory & immune support
Chromium	120 mcg	Supports the action of insulin
Zinc	10mg	Essential to build anti-oxidant enzymes
Magnesium	114mg	Essential in many metabolic reactions
Iodine	100mcg	Essential to produce thyroid hormones
Copper	1mg	A co-factor for anti-oxidant enzymes
Calcium	177mg	Important in bone formation
Manganese	2mg	A co-factor for anti-oxidant enzymes
Molybdenum	40mcg	A co-factor for several vital enzymes
Vitamin A	800mcg	Important in immune function
Vitamin B1	7.5mg	Helps convert food into energy
Vitamin B2	7.5 mg	Essential to metabolise food for energy
Vitamin B3	15mg	Helps boost protective HDL cholesterol
Vitamin B5	11.25mg	Helps convert food into energy
Vitamin B6	7.5 mg	Essential to metabolise food for energy
Biotin (B7)	150mcg	Helps convert food into energy
Folic Acid (B9)	200mcg	Provides vital methyl groups
Vitamin B 12	6.75 mcg	Anti-inflammatory

Note on IRON

Men, and women after the menopause, generally do not require supplemental **iron**, as excess iron in the body is pro-inflammatory.

Women before their menopause do need iron in their supplement, and this is supplied in addition to NutriShield on request.

APPENDIX 2

People over about 50 – or with a particularly stressful lifestyle – should consider **NUTRISHIELD PREMIUM**, which ADDS the following nutrients to those in Essentials.

www.nutrishield.com

Nutrient	Level	Function
Co Enzyme Q10	30 mg	Anti-oxidant – mitochondrial health
Soy Isoflavones	40 mg	Anti-inflammatory – may also help normalise damaged cells
Betaine	450 mg	Provides vital methyl groups; lowers dangerous homocysteine levels
Beta carotene	7 mg	Anti-oxidant, anti-inflammatory
Lutein	6 mg	Anti-oxidant. Eye health
Glucosamine	415 mg	Works to help build connective tissue, working together with vitamins K and D
Zeaxanthin	42 mcg	Anti-oxidant, eye health
Cryptoxanthin	49 mcg	Anti-oxidant
Lycopene	5 mg	Anti-oxidant. May protect prostate, brain and gastro-intestinal tract

Note on IRON

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APPENDIX 3

LABORATORY TESTS

Test results on NutriShield can be seen at

<http://uni-vite.com/Nutrishield/documents/VivacellSummaryWeb.pdf>

The independent laboratory “Vivacell” in Germany used the industry standard inflammatory biomarkers Interleukin 1 beta (IL1beta), Tumor Necrosis Factor (TNF alpha), Interleukin 6 (IL6), Interleukin 8 (IL8), Prostaglandin E2 (PGE2) and Isoprostane 8-(Iso-PGF2-alpha Isoprostan).

The report supports the conviction that only a combination of nutrients that mimics an ideal diet can be truly effective.

The report concluded:

“Our data clearly provide evidence that NutriShield® creates potent anti-inflammatory and anti-oxidant effects.

“NutriShield® is therefore a bioactive nutraceutical to be used to help prevent inflammatory disease of any kind.

“Our data find a synergistic effect of the several ingredients of NutriShield® since the combination was more effective than the summary of the single ingredients.”

WHAT NEXT?

You can visit the NutriShield website at www.nutrishield.com

Dr Paul Clayton has written a very well-reviewed and highly recommended bestseller called ***Health Defence***, which you can buy from www.healthdefence.com, Amazon or other booksellers.

About *Health Defence*

“Dr Paul Clayton has developed a multitude of creative and innovative solutions for the promotion of human health and wellbeing.”

David Richardson

**Visiting Professor, Food and Nutrition Science
University of Newcastle on Tyne**

“This book is a must for everyone –
it will educate and inspire.”

What Medicine? Magazine

He also has a website at www.drpaulclayton.com.

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