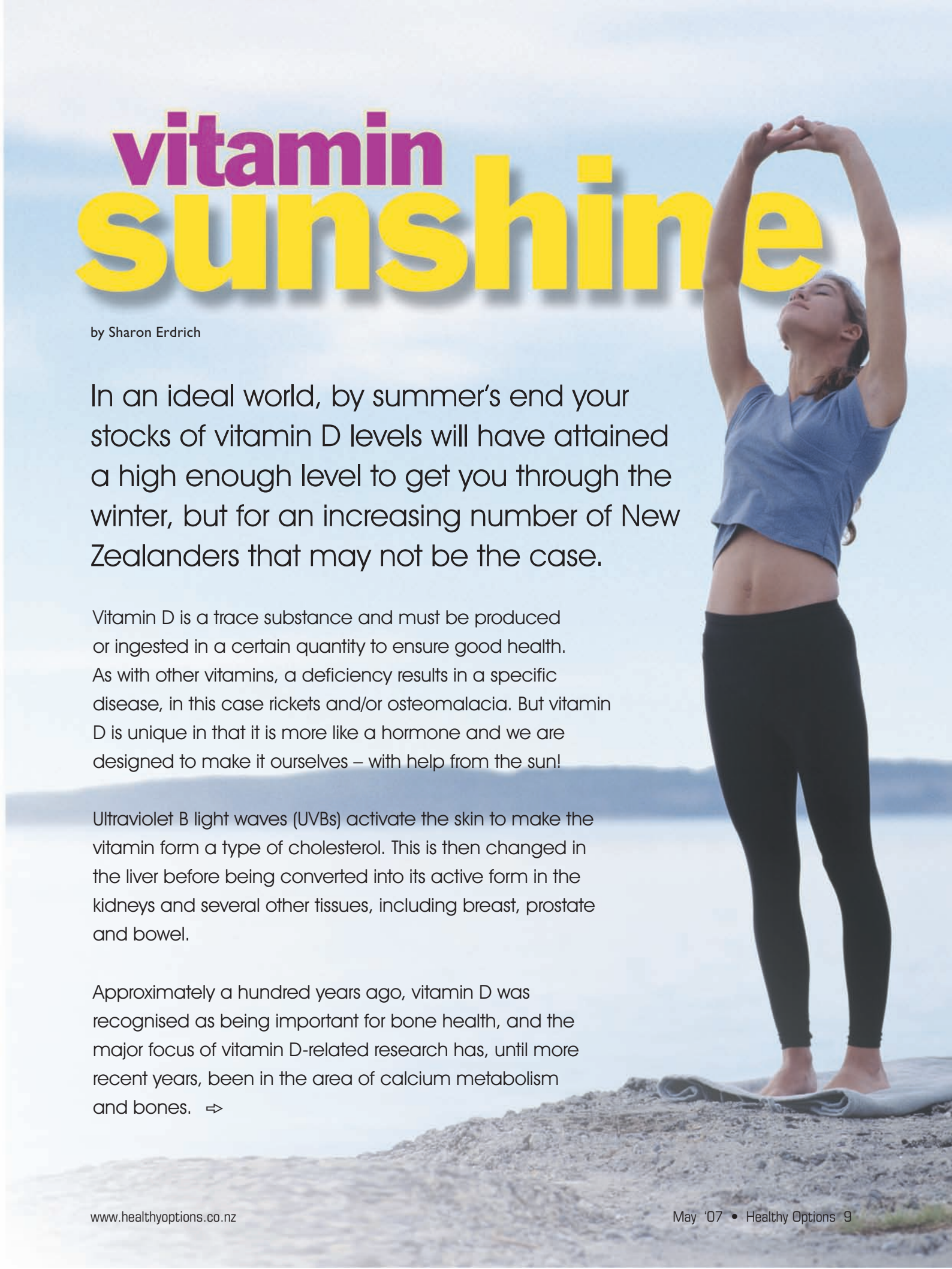
vitamin sunshine

by Sharon Erdrich



In an ideal world, by summer's end your stocks of vitamin D levels will have attained a high enough level to get you through the winter, but for an increasing number of New Zealanders that may not be the case.

Vitamin D is a trace substance and must be produced or ingested in a certain quantity to ensure good health. As with other vitamins, a deficiency results in a specific disease, in this case rickets and/or osteomalacia. But vitamin D is unique in that it is more like a hormone and we are designed to make it ourselves – with help from the sun!

Ultraviolet B light waves (UVBs) activate the skin to make the vitamin form a type of cholesterol. This is then changed in the liver before being converted into its active form in the kidneys and several other tissues, including breast, prostate and bowel.

Approximately a hundred years ago, vitamin D was recognised as being important for bone health, and the major focus of vitamin D-related research has, until more recent years, been in the area of calcium metabolism and bones. ⇨

Down to the bone

The most dramatic effect of vitamin D is the enhancement of the absorption of calcium in the intestines (as well as stimulating absorption of both phosphate and magnesium) which is then used in bone metabolism.

Severe vitamin D deficiency due to inadequate sun exposure in the 19th century produced an epidemic of rickets, resulting in growth retardation, muscle weakness, skeletal deformities, low blood calcium levels, tetany (cramps and/or muscle spasms) and seizures. The encouragement of sensible sun exposure and the fortification of milk with vitamin D resulted in an almost complete eradication of the disease.

However, vitamin D deficiency has again become an epidemic in children, and rickets has become a global health issue. In addition to causing rickets, low vitamin D prevents children from attaining their genetically programmed peak bone mass, contributes to and exacerbates osteoporosis in adults, and causes the often painful bone disease, osteomalacia.

Beyond rickets

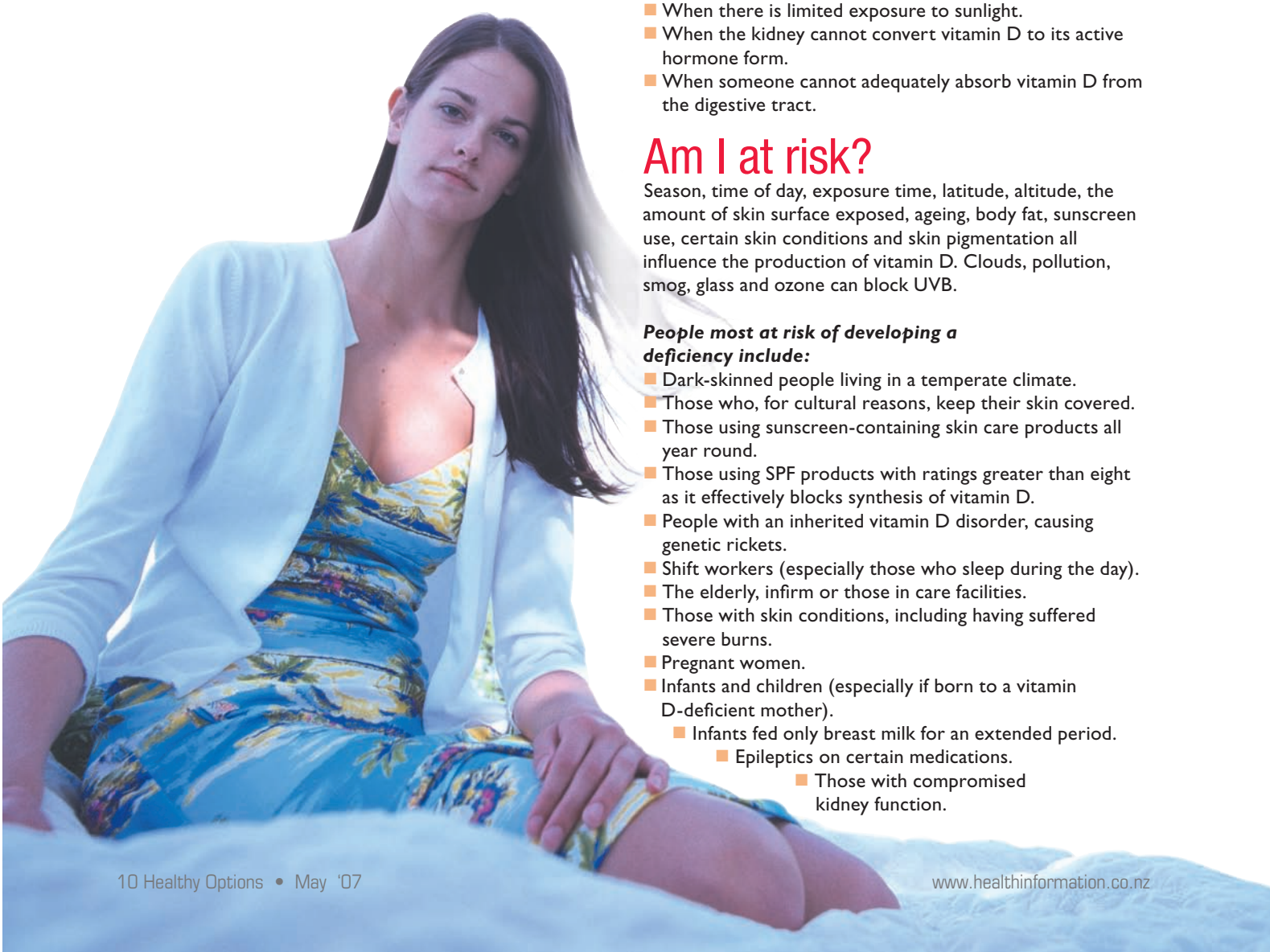
There is a growing mountain of evidence that, even before birth as well as during a person's lifetime, vitamin D plays a role in the prevention of several chronic diseases of which multiple sclerosis and schizophrenia are the most studied. Both conditions have higher rates of occurrence in countries closer to the poles and in dark-skinned people living at higher latitudes.

Receptors for the vitamin have been found in a wide variety of tissues and a variety of conditions, including depression, seasonal affective disorder (SAD, or the 'Winter Blues'), Parkinson's disease, various autoimmune disorders, gingivitis (gum disease), insulin resistance, cardiovascular disease, diabetes, high blood pressure, heart failure, influenza, psoriasis, gout, interstitial cystitis, decreased pulmonary function, chronic kidney disease, pancreatitis, rheumatism, hepatitis B, haemochromatosis, gastrointestinal diseases and many common cancers, particularly of the breast, colon and prostate, have been connected to inadequate vitamin D. Conversely, an adequate supply of vitamin D seems to reduce the incidence rates or improve the prognosis of several cancer forms, including prostate, breast and colon cancer, as well as of lymphomas.

Vitamin D has a direct action on muscle function and is vital for muscle contraction, thus a deficiency can cause impaired muscle function and muscle weakness which may lead to falls in the elderly, general clumsiness, and a drop in athletic performance – especially during winter. These conditions are reversible following vitamin D supplementation.

When can a deficiency occur?

- When usual intake is below recommended levels.
- When there is limited exposure to sunlight.
- When the kidney cannot convert vitamin D to its active hormone form.
- When someone cannot adequately absorb vitamin D from the digestive tract.



Am I at risk?

Season, time of day, exposure time, latitude, altitude, the amount of skin surface exposed, ageing, body fat, sunscreen use, certain skin conditions and skin pigmentation all influence the production of vitamin D. Clouds, pollution, smog, glass and ozone can block UVB.

People most at risk of developing a deficiency include:

- Dark-skinned people living in a temperate climate.
- Those who, for cultural reasons, keep their skin covered.
- Those using sunscreen-containing skin care products all year round.
- Those using SPF products with ratings greater than eight as it effectively blocks synthesis of vitamin D.
- People with an inherited vitamin D disorder, causing genetic rickets.
- Shift workers (especially those who sleep during the day).
- The elderly, infirm or those in care facilities.
- Those with skin conditions, including having suffered severe burns.
- Pregnant women.
- Infants and children (especially if born to a vitamin D-deficient mother).
- Infants fed only breast milk for an extended period.
- Epileptics on certain medications.
- Those with compromised kidney function.

- Those with a milk allergy or lactose intolerance.
- The obese.
- Those with metabolic syndrome and insulin resistance.
- Those who have had surgery to remove all or part of their stomach or gall bladder.

Other factors that impair the uptake of dietary vitamin D:
- Strict vegetarianism and veganism.
- Avoidance of dairy products and/or fish.
- Intestinal malabsorption.

How common is the problem?

There are several issues when identifying people with vitamin D deficiency:
- The test is expensive compared to the cost of supplementation and doctors are discouraged from performing it.
- Many doctors do not consider testing for it unless a patient has osteomalacia or osteoporosis.
- Currently, lab reports state the target range for blood levels of vitamin D is 50-150nmol/L, yet recent research clearly points to a level of 80-100nmol/L being the minimum required for ***optimal*** functioning of the vitamin.

Bearing in mind that the following statistics relating to deficiency are based on a cut-off point of 50, the true deficiency figures could be a lot higher. Inadequacy has been reported in approximately 36 per cent of otherwise healthy young adults and up to 57 per cent of general medicine patients (in the United States). Eighty-seven per cent of pregnant women in New Zealand had levels below 50 (61 per cent were below 25!); these figures are not confined to veiled women or women with dark skin. In a New Zealand outpatients clinic, 78 per cent of patients were below the reference range and 22 per cent of these had moderate to severe deficiency (less than 25), approximately 50 per cent of school children (age five to 14 years) were below the lower limit threshold.

Vitamin D myths dispelled

Myth: You can get vitamin D from sunshine through a glass window.
Fact: Glass blocks about 95 per cent of UVB.

Myth: Drinking lots of milk is fine if you avoid the sun.
Fact: You'd need to drink almost a litre of milk a day to get just 400 IU/d.

Myth: Being outside very early in the morning or late in the day will give you your quota.
Fact: The sun's rays are too weak at that time to make much difference.

Myth: It's only important for healthy bones.
Fact: It has many other functions in the body.

Myth: You get enough by sitting in the shade.
Fact: You'll get a little bit, reflected from buildings nearby, but it won't be adequate to build up your levels or prevent deficiency.

Myth: Production goes down in skin that's too clean – it needs bacteria.
Fact: No bacteria required! ⇨

Myth: It's made in your eyes too.
Fact: No, just in the skin. Other organs can convert it, but not the eyes.

Myth: New Zealanders are not deficient in vitamin D.
Fact: The overwhelming success of the 'slip, slop, slap' campaign over the years has most New Zealanders actively avoiding the sun. Clothes that cover arms and legs, hats, liberal use of sunblock and seeking the shade have all kept us so effectively protected from the sun that as a nation we're becoming deficient in this crucial nutrient.

Myth: Just a few minutes a day of sun exposure is sufficient to generate enough.
Fact: Adequate sunlight exposure is not easily determined for a given individual – the amount of time required depends on your skin and the time of the year. In winter, you'd need to be outside with at least your arms exposed for most of the day.

Myth: You need to get sunburn to get enough.
Fact: Vitamin D production in the skin occurs within minutes and is already maximised before your skin turns pink. Someone who burns easily may only need five minutes of daily summer sun exposure before 11am and after 4pm (to the face, hands and forearms) to achieve adequate levels, whereas someone who tans more easily or has darker skin will need more time, up to 20 minutes.

Myth: Getting enough vitamin D increases my risk of skin cancer.
Fact: In general, the health benefits accruing from moderate UV irradiation, without redness or excess tanning, greatly outweigh the health risks. Your risk of skin cancer from sensible exposure is lower than your risk of any cancer from being vitamin D deficient.

Myth: Supplementation guarantees vitamin D sufficiency.
Fact: Most multi-vitamins contain around 100IU. Less than 400IU (for adults) is unlikely to have any impact at all and you may need much more.

Myth: Absence of bone disease is proof of enough vitamin D.
Fact: Long-term vitamin D deficiency is often asymptomatic until the development of deficiency-related conditions such as osteoporosis, cancer and autoimmune diseases.

Myth: Current laboratory norms are accurate definitions of vitamin D sufficiency.
Fact: At present, laboratory values are tagged to vitamin D requirements for bone health (range 50-150). Research is consistently showing that this lower limit (50) should be much higher (80-100).

Myth: Vitamin D is toxic.
Fact: All things are toxic in excess – even water! Vitamin D is incredibly low in its toxicity – the oral LD50 for dogs is about 88mg per kg, or 3,520,000 IU/kg. This would be equivalent to a 50kg adult taking 176,000,000 IU or 440,000 of the 400IU doses! Excessive sunlight does not lead to excessive vitamin D levels. The body, in its innate wisdom, has a cut-off mechanism that is activated once vitamin D levels are at a high level.

Dietary sources

FOOD	INTERNATIONAL UNITS (IU) *per serving*	PERCENT DAILY VALUE (DV)
1 T cod liver oil	1360IU	340 per cent
100g cooked salmon	360IU	90 per cent
100g cooked mackerel	345IU	90 per cent
80g canned tuna fish in oil	200IU	50 per cent
50g canned sardines in oil, drained	250IU	70 per cent
1 whole egg	20IU	6 per cent
100g cooked liver or beef	15IU	4 per cent
30g Swiss cheese	12IU	4 per cent
1 cup milk, non fat, reduced fat, and whole, vitamin D fortified	98IU	25 per cent

Note, all of the above are from animal sources. However, some vitamin D-enriched foods such as rice milk are also available. The DV for vitamin D in this chart is 400IU for adults which is by current research, very low. If you totally avoid the sun, recent research indicates you need about 4000 units of vitamin D a day! Which means you can't get enough vitamin D from milk (unless you drink 40 glasses a day) or from a multi-vitamin (unless you take about 10 tablets a day), neither of which is recommended.

Finally

Most of us produce about 20,000 units of vitamin D after about 20 minutes of summer sun. This is about 100 times more vitamin D than the daily Recommended Dietary Intake (RDI). If you don't get vitamin D from sunshine the way Mother Nature intended, you need to take supplemental vitamin D3. Just how much depends on what your levels currently are, but you can be sure that they're low if you've been avoiding the sun.

For more information and research go to www.vitamindcouncil.com

References available on request.

Sharon Erdrich practises from House of Health in Central Auckland. She is a registered nurse with diplomas in naturopathy, herbal medicine and aromatherapy. She is currently studying a MHSc (Nutrition). To contact Sharon, ph: (09) 377 7070 or visit www.houseofhealth.co.nz