

# The Uncensored Family Guide To Vitamin D

## Live longer and healthier with "30 Minutes of Sunshine" (Vitamin D)

By Bill Sardi

What you will learn below will make a greater impact upon your health than cholesterol control, taking a multivitamin, the inclusion of fiber in your diet, taking a daily aspirin tablet, or even antibiotics.  
And it's free if you can spend time outdoors in midday sun.

Based upon striking new discoveries involving the health benefits of vitamin D, and to overcome the growing vitamin D deficiency epidemic, health authorities now recommend every person get 20-30 minutes of this "sunshine vitamin" every day. Vitamin D is naturally produced in the skin upon exposure to solar ultraviolet radiation.

The D-deficiency epidemic is now described in various medical journals [Journal Nutrition 2005 Nov; 135(11):2739S-48S] and is so widespread it has now been called a pandemic by a Harvard Medical School researcher. [Drugs Aging. 2007; 24(12):1017-29] It has been spawned by repeated messages that people need to avoid the sun to prevent skin cancer, cataracts, autoimmune problems and viral eruptions. [Bulletin World Health Organization 2006 Jun; 84(6):485-89]

Vitamin D boosts the immune system and improves cardiovascular health, as well as strengthens muscles, bones and teeth. This is the short list of health benefits now attributed to vitamin D. The list grows as more researchers conduct and publish more research.

All of these new-found health benefits come from a vitamin/hormone that was discovered over 80 years ago, but has been largely ignored by modern medicine. This oversight has ensured a higher level of disease in human populations --- disease that is totally preventable. Noticeably, modern medicine does more to warn the public away from sunlight and vitamin D pills while epidemic-low levels of vitamin D persist throughout the population, even in sunny areas of the country. Furthermore, vitamin D levels are not routinely checked in the population at large.

The result of this misdirection is that Americans are sicker than before adoption of this mistaken advice to avoid the sun. Experts now concede, the health benefits emanating from sun exposure far outweigh the risks. [Journal Cosmetic Dermatology 2003 Apr; 2(2):86-98] Modern medicine has made a huge wrong turn.

Because it is made naturally in the skin, vitamin D is technically considered a hormone. It is essential for life. This means solar radiation is indispensable for human health. But American parents are lathering sunscreen lotion on their kids at a time when their bones and teeth critically need vitamin D and their brain needs vitamin D for proper development. The use of sunscreen with a sun protection factor (SPF) of 8 inhibits more than 95% of vitamin D production in the skin. [American Journal of Clinical Nutrition 80 (6): 1678S-1688S] University of Tennessee dermatologists, in a report entitled "Darkness at noon: sunscreens and vitamin D3," point out that sunscreen lotion is far more effective at blocking the vitamin D-producing UVB rays than it is at preventing a sunburn. [Photochemistry Photobiology 2007; 83: 459-63]

Even more alarming – vitamin D-deficient newborn animals have abnormally shaped brains! [J Steroid Biochem Mol Biol. 2004 May; 89-90(1-5):557-60] In animals, transient early life vitamin D deficiency not only disrupts brain development but leads to persistent changes in the adult brain.

[Brain Research Bulletin 2005 Mar 15; 65(2):141-8] The idea of using sunscreen lotion on growing kids who need more vitamin D for proper bone growth and brain development, appears to be errant advice.

### **The most economical vitamin (it's free), yet deficiency is rampant**

Vitamin D is as cheap as sunshine. Yet the masses are deficient.

Ninety percent of vitamin D comes from sunshine. The impracticality of obtaining daily sun exposure combined with the impossibility of obtaining sufficient amounts of vitamin D from the diet, and the fact Americans have become phobic over sun exposure due to concerns about skin cancer, has led to a “*sun deprived*” population that is suffering many avoidable health problems from the effects of low vitamin D.

Modern humans live in the shadows, burrowed like nocturnal animals as they drive to work in automobiles, spend most of the midday hours indoors when solar ultraviolet rays that produce natural vitamin D are most intense, and often exercise in the early AM or late PM when very little vitamin D is produced from sunlight.

There are modern solutions to this ongoing sun deprivation syndrome. However, artificial sunlight in the form of sunlamps and tanning beds are not commonly utilized, considered only for the vain who want to look tanned. Dermatologists warn against skin cancer and the masses cover-up even more.

Furthermore, sunlight exposure during winter months at northern latitudes (Seattle, Chicago, Boston) produces virtually no natural vitamin D. This is due to the altered angle of the sun as the earth tilts away from the sun during winter months. Sun rays must pass through a thicker atmosphere in winter in northern climates. Very few of the vitamin D-producing UV-B rays reach the surface of the earth during winter at 40° North latitude and higher (examples: Denver, Philadelphia).

The result:

- **World death rates rise in winter**, when vitamin D levels are lowest in human populations. Cancer survival is shorter in winter. [International Journal Cancer. 2006 Oct 1; 119(7):1530-6] There is a cancer belt that encircles the globe, in northern latitudes, that runs from Seattle to Detroit to Boston, London, Moscow --- where vitamin D levels are lowest, especially in winter months. Just modest-dose vitamin D supplementation, 300-2000 IU, results in a 7% decline in the overall death rate [Archives Internal Medicine 2007 Sep 10;167(16):1730-7], even though this level of supplementation barely produces a measurable rise in blood levels of vitamin D.
- **Infectious disease** – influenza and the common cold – sweeps the globe during winter months, primarily due to a lack of vitamin D. Modern medicine continues in its attempt to prevent wintertime influenza epidemics by promotion problematic and ineffective vaccination programs against flu viruses. Flu viruses rapidly mutate, faster than new strains of vaccines can be produced for the upcoming flu season. So most of the time, the flu vaccine available does not produce antibodies for the specific seasonal viral strain in circulation.

Vaccination against the flu has been found to be ineffective at reducing mortality rates in the largest at-risk group – senior adults. [European Respiratory Journal 2007 Sep; 30(3):414-22] In the 70+ age-group that accounts for three-quarters of all influenza-related deaths, published studies are unable to confirm a decline in influenza-related mortality since 1980, even as vaccination coverage increased from 15% to 65%. [Lancet Infectious Disease 2007 Oct; 7(10):658-66]

Vitamin D deficiency results in a weakened immune system. It has long been known that children with rickets (softened bone) exhibit poor immunity against infection. For example, dark-skinned children with rickets were found to be 13 times more likely to develop pneumonia than children without rickets. [*Lancet* (June 21, 1997) 349, 1801-1804] Is vaccination against the flu appropriate in an immune-compromised population that is vitamin D deficient? [*Epidemiology Infection* 2006 Dec; 134(6):1129-40] Researchers now theorize the yearly flu season is spawned by the onset of wintertime-low vitamin D levels. [*Epidemiology & Infection* 2006 Dec;134(6):1129-40]

- **The return of rickets:** Americans are so sun-deprived that rickets, a softening of the bones, is returning. [*Advances In Pediatrics* 2007; 54:115-33] Called rickets in childhood, it is called osteomalacia in adulthood.

### Hiding from the sun

What is the first thing that most people do when they get sick? When they become old and infirm? They wrap themselves up in blankets, cloister themselves indoors, away from the health-giving sun rays that produce vitamin D. The hospitalized, the infirm seniors in nursing homes, even people battling the common cold, are confined, indoors.

### Insufficient vitamin D in foods

Many Americans falsely believe they get vitamin D in milk or their multivitamin, and that is sufficient.

*"I get vitamin D in my milk."*

*"There is vitamin D in my calcium supplement."*

*"I get some sunshine every day."*

How misled Americans are who say they are getting enough vitamin D.

No, you cannot obtain sufficient amounts of vitamin D from foods, and it is unlikely you will obtain optimal amounts of vitamin D from sun exposure, especially if you live in northern climates. The best diet, even drinking vitamin D-fortified milk, will provide only a few hundred units of vitamin D, while your body needs thousands of units to maintain optimal health.

### Trivial amounts of vitamin D3 in foods

Food	Amount	Equivalent to
Milk, 8-ounce glass	100 IU fortified	~45 seconds of sunshine*
Whole egg	20 IU	~8 seconds of sunshine*
Butter, 1 tablespoon	8 IU	~5 seconds of sunshine*
Fish, canned or fresh	200-400 IU	~1.5-3 minutes of sunshine* (contains mercury)
Cod liver oil, tablespoon	1360 IU	~8 minutes of sunshine*
Total American diet, daily	200-250 IU	~1.5-2.0 minutes of sunshine*

\*Calculated at maximum total-body sun exposure for one-half hour at noontime in the summer sun at a southern latitude = 10,000 IU. This is a very optimistic estimate which assumed ideal conditions to produce natural vitamin D. In real life, probably 10-fold more time needs to be spent in the sun to produce the amount of vitamin D levels above.

## **Making it worse**

To make matters worse, millions of Americans take antacid heartburn medications (histamine blockers) that impair vitamin D absorption from foods. [Digestion 1990; 46(2):61-4]

### **“I get plenty of sunshine”**

The recommended 30 minutes of sunshine, which produces optimal amounts of vitamin D, is produced only in summer months with total body skin exposure to midday sun (10 AM to 3 PM). Unless your shirt is off, it's unlikely you will produce much vitamin D unless you spend a prolonged time in the midday sun. Often only the face, arms and neck are exposed, so that 30 minutes spent outdoors will produce minimal vitamin D production in the skin.

In a report entitled “*Low vitamin D status despite abundant sun exposure*,” researchers at the University of Wisconsin surveyed adults living in sunny Honolulu, Hawaii (21 degrees north latitude), who estimated their exposure to sun was 28.9 hours a week. Yet this group of adults exhibited low vitamin D levels. Better than 50% had vitamin D levels below 30 nanograms per milliliter of blood serum. Maximum blood levels of vitamin D produced by sun exposure is ~ 60 nanograms per milliliter. [Journal Clinical Endocrinology Metabolism 2007; 92: 2130-35]

Researchers now say the only people who exhibit optimal levels of vitamin D are those who regularly take their shirt off and obtain midday sun on a daily basis, or those who take high-dose vitamin supplements. [Progress Biophysics Molecular Biology 2006 Sep; 92(1):26-32]

For people with darkly pigmented skin, they need even more sun exposure because they don't make vitamin D as efficiently as light-skinned individuals. Many common health problems observed among dark-skinned populations emanate from a lack of vitamin D, particularly if they live in northern climates where solar-ultraviolet radiation intensity is weak in winter months. There is special public health advisory issued for people with darkly-pigmented skin to get more vitamin D.

## **Labels on foods**

So, unwary Americans who are concerned about vitamin D deficiency might check food labels to see if they are getting enough vitamin D, and when they do, the labels often say their foods or vitamin pills provide 100% of the Adequate Intake, so consumers falsely believe they are getting enough vitamin D.

The labels mislead. In fact, health authorities admit they don't have sufficient data to even develop a Recommended Daily Allowance (RDA) for vitamin D (the RDA level would be sufficient for 97-98% of the population), so they punt and publish a guesstimate called the Adequate Intake (AI) – the level of intake commonly found among healthy individuals.

As Dr. Reinhold Vieth points out, the Adequate Intake levels for young adults (5 micrograms or 200 IU) was chosen to approximate twice the average vitamin D intake reported by 52 young women in a questionnaire-based study reported from Omaha, Nebraska, in 1997. [Canadian Medical Association Journal 166; 12, June 11, 2002]

But what if seemingly healthy individuals are all deficient in vitamin D? Vitamin D deficiency can result in conditions that produce no immediate symptoms, like bone softening, arterial calcification, poor immunity, and even if symptoms of deficiency did arise, how would a consumer associate them with a shortage of vitamin D? A seemingly healthy individual may have frequent colds, their bones may be withering away from within, and experience a wintertime mood decline, all due to lack of vitamin D.

The Adequate Intake level for vitamin D (1998) is:

- Ages 19-50: 200 International Units (IU); 5 micrograms
- Ages 51-69: 400 IU; 10 micrograms
- Age 70 and older: 600 IU; 15 micrograms

The vitamin D epidemic would proceed without a slowdown if consuming the Adequate Intake. These are intake levels that would barely prevent overt rickets or osteomalacia. Knowing that you are getting just enough vitamin D to prevent rickets does not mean you are getting enough vitamin D for optimal health.

### **The absurd “safe upper limit”**

So how much vitamin D is too much? What the National Academy of Sciences says is that 600 IU is OK, but that 2000 IU might be too much. How could this be? Forty units of vitamin D equals only 1 microgram by weight. So 600 IU is just 15 micrograms ( $1/67^{\text{th}}$  of a milligram), and 2000 IU (the potential overdose point) is 50 micrograms ( $1/20^{\text{th}}$  of a milligram), hardly much difference.

The Tolerable “*totally safe*” Upper Intake Level (ULs) for vitamin D are as follows: infants, 0-12 months, 25 micrograms (1,000 IU) per day; children and adults, 50 micrograms (2,000 IU) per day; pregnant and lactating women, 50 micrograms (2,000 IU) per day.

Two-thousand units is equivalent to just 12 minutes of total-body exposure to the summer sun. Since when did 12 minutes of sun bathing result in vitamin D overload? Obviously, something is amiss here, as it has been for decades. The “*safe upper limit*” is absurd, and health authorities must know this.

One reason why the Safer Upper Limit is misleading has to do with the way it is established, at 5 times lower than the lowest reported dose that produces minimal side effects, or five times lower than 10,000 IU. But here again, a half-hour of total-body sun exposure to the summer sun produces about 10,000 IU of natural vitamin D, again without reported vitamin D toxicity. In fact, the lowest dose of vitamin supplemental vitamin D3 reported to cause toxicity is 40,000 IU, or 20 times greater than the “*safe upper limit*.” [American Journal Clinical Nutrition 1999 May;69(5):842-56]

Even then, doctors inject 300,000 IU of synthetic vitamin D2 to infirm elderly adults to prevent bone loss during winter months without side effect. [Age and Ageing 2005; 34: 542–544] Single-dose 100,000 IU oral vitamin D3 does not cause side effects either. [British Medical Journal 2003; 326:469]

### **Don't ask a doctor**

But don't ask a physician or dietician what a safe dose of vitamin D is – you are likely to be scared away from taking anything more than a trivial amount.

Doctors, nurses and dieticians have been trained to warn their patients away from vitamin D pills. Medical textbooks are so out of date as to mislead many.

In fact most, most preventive health messages issued by modern medicine (lower cholesterol, don't eat eggs, eat hydrogenated-fat rich margarine instead of butter, take calcium supplements, use sunscreen lotion, get vaccinated for the flu, avoid dietary supplements because you can get all the nutrients you need out of your diet) have served to maintain a high level of disease in human populations rather than actually lower the incidence of disease. There is no exception for vitamin D.

Doctors often bring up the possibility of liver toxicity from vitamin D overload. Liver toxicity has been produced among adults who consume excessive amounts of another fat-soluble vitamin that is stored in the liver – vitamin A, so it is assumed that high-dose vitamin D will do the same. Concern that vitamin D may out-compete with vitamin A for storage in the liver has not been demonstrated, but is likely. There is about 6000 IU of vitamin A in the typical American diet, so it is unlikely higher-dose vitamin D will result in a shortage of vitamin A.

Even the National Academy of Sciences suggests 2000 international units (IU) is the “*safe upper limit*” for vitamin D. How ridiculous this recommendation is.

Two-thousand IU of vitamin D3 (D3 is the natural form of vitamin D, D2 is the synthetic form, found in some vitamin supplements), would be equivalent to laying on the beach in a swimsuit and getting just 12 minutes of midday summer sunshine in sunny Florida. Obviously, vitamin D overdoses are not reported from sunning. Sunburn may occur, but not vitamin D toxicity. A half hour total-body exposure to midday summer sun produces about 10,000 IU of vitamin D3.

If you are going to obtain the amount of vitamin D your body needs for optimal health, you are going to have to ignore recommendations from your family doctor, your dermatologist, and the National Academy of Sciences.

And, may we ask, with rampant vitamin D deficiency in the population, just what is the value of an annual physical examination by a doctor without measurement of vitamin D levels?

### **Vitamin D censorship**

This short review won't be able to cover all the other applications for vitamin D, ranging from autoimmune problems, to prevention of organ transplant rejection, high blood pressure, prostate health, type I diabetes, osteoporosis, arthritis, multiple sclerosis, all which are disease applications that manufacturers of vitamin D supplements cannot say anything about. Can you imagine, even the mention of prevention of rickets on vitamin D bottles is forbidden by existing regulations.

There is much more that you and your family needs to know about vitamin D, but health authorities forbid this information be included on labels of vitamin D supplements, where consumers can conveniently see it. While federal health agencies forbid such information from being printed on product labels or advertising materials (no mention of disease prevention or treatment can be made), mention of anatomical structures and biological functions affected by vitamin D can be published. Here are some for your quick review:

Obtain optimal vitamin D levels in your body, and.....

- **Calcifications in your blood vessels will disappear.** Hardening and stiffening of the arteries will dissipate. Vitamin D is an anti-calcifying agent. [Nephrology 2007 Oct;12(5):500-9] There is a growing body of evidence that calcification, not cholesterol, is the primary problem in aging arteries. Arterial plaque is largely comprised of calcium (50%) compared to cholesterol (3%). Yet modern medicine claims vitamin D promotes calcifications in the body. This is true, but only at 1 million units of intake! How the public has been misled.
- **Your innate immune system will work at optimal efficiency,** enough to fight off infections like the common cold. The innate immune system also destroys malignant cells that may roam throughout the body.
- **Your bones will harden, and so will your teeth.** Vitamin D works better than fluoride in hardening teeth and preventing dental decay. High-dose calcium supplements may only

worsen calcifications, especially among postmenopausal females who do not produce sufficient estrogen to hold calcium in bones any longer. The best approach is to supplement with vitamin D, which produces optimal utilization of calcium and magnesium.

Instead of fluoride treatments, your children should be given vitamin D. Dental cavities are seasonal – they occur more frequently in the winter when vitamin D levels are low and dental enamel is soft. Evidence of this has been in the medical literature since the 1930s but conveniently overlooked by modern dentistry.

Dentist Don Chalmers Lyons cited a study that found 2500 children in Ireland, 83% whom had rickets (softening bones from vitamin D deficiency), and 91% of these kids also had decayed teeth. Of children free of signs of rickets, 73% had mouths free of decay! [American Journal of Nursing 33: 203-06, 1933]

As early as 1932 animal experiments revealed that vitamin D supplementation vanquished dental decay and the lack of vitamin D resulted in one-third of the animals developing cavities. [Physiology. Review 19: 389-414, 1939]

By 1938 dentists observed that tooth decay was seasonal. Cavities were more likely to occur in winter months than in the sunny months of summer. So Doctors E.C. McBeath and T.F. Zucker of Columbia University, knowing vitamin D levels are higher in summer than winter, began an experiment. They provided 800 international units (IU) of vitamin D to school children for an entire year. The 800 IU dose of vitamin D, and not a lower dose, reduced cavities by over 50%. [Journal Nutrition 15: 547-64, 1938]

Supplemental vitamin D also improves dental health among adults. In a study of adults over age 65 years, the provision of vitamin D cut the number of lost teeth in half. [American Journal Medicine 111: 452-56, 2001]

- **Your mood will likely rise with vitamin D supplementation.** [Psychopharmacology 1998 Feb;135(4):319-23] In winter months there is a season sadness that is only overcome by skin exposure to ultraviolet-emitting lamps. Vitamin D deficiency is associated with a low mood. [American Journal Geriatric Psychiatry 2006 Dec;14(12):1032-40]
- **Your muscles will work at optimal efficiency.** Only recently have researchers recognized that higher vitamin D levels were producing fewer falls and broken hips among retirees, not because vitamin D hardens bones, but because vitamin D prevents loss of balance and greater muscle tone. [Journal Nutrition Elderly 2005;25(1):7-19] Many middle-aged women who complain of chronic muscle aches are simply vitamin D deficient. The muscles are groaning for more vitamin D.

Vitamin D may become the next physical enhancement supplement for athletes, particularly for those athletes who participate in winter sports (football, hockey) or indoor sports (basketball, skating, etc.). Vitamin D's effect upon muscle includes the heart muscle. [Heart Failure Review 2006 Mar;11(1):25-33]

Physical exercise is often extolled for many reasons. Add vitamin D to the list. A recent study shows that overweight individuals who don't exercise are twice as likely to exhibit low vitamin D levels compared to those who do exercise. [Journal Steroidal Biochemistry Molecular Biology 103: 679-81, 2007] Is it the exercise, or that exercise if often conducted outdoors in sunlight? Exercise in an indoor gym does not produce the same health benefits as midday outdoor exercise.

- **Vitamin D has a profound effect upon metabolism.** Pregnant females who are vitamin D deficient are far more likely to gain excessive weight. [Journal Nutrition 2007 Nov;137(11):2437-42] More than half of the children in the U.S. who are considered to be obese have abjectly low vitamin D levels. [Journal Pediatric Endocrinology Metabolism 2007 Jul;20(7):817-23] Vitamin D deficient individuals have more difficulty with their metabolism – handling sugar and insulin – than others. [Clinical Nutrition 2007 Oct;26(5):573-80] Overweight individuals need more vitamin D. [Journal Clinical Endocrinology Metabolism 2005 Jul;90(7):4119-23]

### Vitamin D and hardening of the arteries

If you believe cholesterol is the major culprit in arterial disease you have been misled like so many others. Dr. John Abramson of Harvard Medical School and author of “*Overdosed America*,” after conducting a review of all published studies, could not find any evidence cholesterol-lowering statin drugs reduce mortality for heart disease. [Lancet 2007; 369:168-169]

You will be surprised to learn only about 3% of arterial plaque is cholesterol and 50% is calcium. [International Journal Cardiology 1991 Nov; 33 (2):191-8] The presence of arterial calcification is a predictor of poor 5-year survival. Calcification results in stiff arteries. Cholesterol on the other hand is soft and waxy and does not produce hardened arteries. If statin drugs have any health benefit it is that they modestly raise vitamin D levels. (See chart below) Why take an expensive liver-toxic drug when all that may be needed for cardiovascular health is a vitamin pill?

Drug Status	Took drug or inactive placebo	Vitamin D level (nanomole/Liter of blood)
No statin	Active	65.9
	Placebo	38.4
On statin	Active	74.0
	Placebo	50.0

Source: American Journal Cardiology 2007 October 15; 100(8): 1329.

In 2006 Dr. Davis S Grimes of the Blackburn Royal Infirmary in Great Britain, ruffled a lot of feathers in the medical world when he revealed that statin drugs appear to be synthetic versions of vitamin D. [Lancet 2006 Jul 1; 368(9529):83-6] The pharmaceutical world was quick to deny the allegation.

In his report entitled “*Are statin analogs of vitamin D?*” Dr. Grimes claims that the concept of statin drugs may come from vitamin D as they appear to be molecular alterations of this vitamin. Because these vitamin D analogs had toxic liver side effects, their pharmaceutical inventors appear to have turned this drawback into a so-called advantage – that they inhibited cholesterol production in the liver. Instead of noting their ability to modestly increase vitamin D levels and prevent arterial calcifications, which comprises the majority of arterial plaque, statin drugs were promoted for reduction of cholesterol, which only represents a small fraction of arterial plaque.

Where does arterial calcification fit in with vitamin D? Doesn't vitamin D help the body utilize calcium? Doesn't high-dose vitamin D actually induce calcification? That's what modern medicine has told the public for decades.

Vitamin D certainly does induce calcification, but at concentrations and doses that simply cannot be achieved except in an experimental laboratory.

For decades the claim is that safer “*analogs*” (patentable prescription varieties) of vitamin D must be developed because high-dose vitamin D produces calcifications in arteries that results in arterial stiffness and heart enlargement. So researchers have pursued the development of vitamin D-like drugs that won't induce calcification. The problem is, high-dose vitamin D does induce calcifications in animals, but at human equivalent doses of 21,000,000 IU!

To make matters worse, researchers in Germany point out that a deficiency of vitamin D induces calcification and that “almost all atherosclerotic plaque in arteries are calcified.” Without sufficient vitamin D your arteries are likely to harden due to calcification.

End-stage kidney disease patients, who experience severe arterial calcification, have mortality rates that are 10-20 times higher than the general population. [Current Opinion Lipidology 18:41–46: 2007] Imagine what vitamin D supplements could do for these patients.

So, do patients receiving vitamin D supplements exhibit higher mortality rates from cardiovascular disease? When an active form of vitamin D was given to a group of Japanese adults, they experienced a 70% decline in their risk of dying from cardiovascular disease!

Of considerable interest is a report of an 89-year old woman at a nursing home in Wisconsin who was being given 50,000 IU of vitamin D2 per day along with supplemental calcium. When she was switched from calcium carbonate to calcium citrate, severe calcification occurred. Calcium citrate is highly absorbable and can be taken in between meals and absorbed when stomach acid levels are low. [American Journal Geriatric Pharmacotherapy 2006 Mar; 4(1):70-4] It was the highly-absorbable form of calcium, not the vitamin D, which induced calcification.

### **Confined indoors**

Hospitals have become one of the most dangerous places because, due to over-use of man-made antibiotics, antibiotic-resistant bacteria reside there. Yet a relatively recent discovery is that vitamin D produces antibiotic peptides – natural antibiotics – that can quell any infection, bacterial, viral or fungal. [Immunology 2006 Aug; 118(4):509-19] Susceptibility to infection of any kind is now considered to be governed by vitamin D. [Science 2006 Mar 24; 311(5768):1770-3] Thousands of hospitalized patients die of germ-resistant infections while vitamin D is never considered.

But what do we do when illness strikes? We place the very sick inside dark caves -- hospital intensive care wards-- making them more vulnerable to infection. The innate immune system, which produces germ-fighting cells called neutrophils, macrophages and natural killer cells, is sub-par without adequate vitamin D. Vitamin D deficiency is very common in hospitals, but no hospital routinely tests for vitamin D levels. [Journal Academy Nurse Practitioners 2007 Dec; 19(12):642-651] In a recent study, 94% of patients admitted to a rehabilitation hospital exhibited less than optimal levels of vitamin D. [American J Physical Medicine Rehabilitation 2007 Jun; 86(6):435-45]

Nursing home patients are typically pale because of a lack of sun. Every older adult that resides in a nursing home should be taken for midday sunning and receive vitamin D supplements.

In the 1950s Huntington Memorial Hospital in Pasadena, California, built 3-winged single-story structure so every patient housed within could exit via a sliding doorway to sun outdoors in their wheelchairs or hospital beds. This concept was extolled in *The Reader's Digest*. The building was eventually torn down and the idea of sun and health was forgotten.

### **Your problem: how to know how much to take, and how to overcome your unfounded fear of overdosage?**

Regardless of what is documented here, like many others you will be reticent to move ahead and take so-called high-dose vitamin D. What could possibly happen if you overdose on vitamin D? Even if you decide to take high-dose vitamin D, is it safe for your children, your frail grandparents, or those who get plenty of sunshine?

First, you should know that vitamin D intoxication has never been reported because of excessive exposure to sunlight. In fact, after being out in the sun for an extended time, beyond an hour or two, the body self-limits the amount of vitamin D that is being produced. So there is simply no

concern over excessive vitamin D from sun exposure. There is an exception for people who have autoimmune disease, which will be discussed below.

But what about vitamin D pills? Do these pills provide the same form of vitamin D as produced naturally in your body after sun exposure? Yes, if you obtain vitamin D3 (cholecalciferol) it is the same molecule that is produced in your skin and stored in your liver. Vitamin D2 (ergocalciferol) is a synthetic form of vitamin D that is not preferred.

### **But are vitamin D pills safe?**

Imagine you dropped some sugar cubes into your cup of coffee every morning and months later you were told you ingested a toxic dose of vitamin D that was laced into the sugar cubes. Can you imagine the panic, the fear you might die, the rush to the hospital emergency room to have your stomach pumped? Well, this actually happened to two men. Over a period of 7 months they consumed vitamin D-fortified sugar cubes that had been over-fortified. They had received 1.7 million IU of vitamin D3 per day! They experienced calcifications, kidney calcium deposits, dehydration, nausea, vomiting, weight loss, and some stomach problems, but otherwise their recovery was rapid on a normal diet. [Lancet 2002; 359: 672]

No problems have been reported giving oral vitamin D3 in doses ranging from 14,000 to 50,000 IU per day. For example, in New Zealand, 32 women were given 50,000 IU vitamin D3 per day for 10 days. No side effects were reported.

In 1989 doctors prescribed 150,000 IU of vitamin D per week along with calcium to postmenopausal women without side effect (no calcifications). This regimen resulted in a marked reduction in bone pain and a 3-fold reduction in bone fractures. [Calcified Tissue International 1989; 45: 137-41] Doctors in New Zealand report injection of 300,000 IU of vitamin D in a single dose to remedy a frank vitamin D deficiency. [New Zealand Medical Journal 2003; 116: U536]

Yes, but what about little children? Let me put you at ease. Doctor José F. Cara, in a presentation at the annual meeting of the American Academy of Pediatrics in the year 2000, said if young infants develop rickets, an injection of vitamin D *“may be given as a single intramuscular injection of 300,000 to 600,000 IU (10,000-15,000 mcg).”* Imagine now, you are worrying about your ill children getting too much vitamin D from a pill when a pediatrician injects hundreds of thousands of units directly into a 10-pound infant.

### **Personal experience**

Let me share with you personal experience. It is the only way, without having to confuse you with numbers and charts, to calm your concerns over high-dose vitamin D.

Dr. John Cannell of the Vitamin D Council shared with me that he recommends people, upon the first symptom of a cold (runny nose), take 50,000 IU of vitamin D2 orally. He actually had a whole hospital ward of patients taking that much vitamin D to prevent colds and flu. It worked without side effect. And it worked fast.

So, sitting at my desk weeks later I had a runny nose. I reach for vitamin D pills and took 20,000 IU. My runny nose disappeared in minutes. Well, that really works, I thought. The runny nose returned hours later, so another dose of vitamin D. Again, symptoms quickly disappeared.

Usually a cold produces its most severe symptoms in the first three days, and then your innate immune system catches up with the rapidly replicating viruses and mounts an army of germ-fighting white blood cells called neutrophils, macrophages and natural killer cells, to slowly quell your illness. But what if you could activate that army of immune fighters sooner? That is what vitamin D does. This is what modern medicine has been hiding from the public for decades.

So I wondered, what about my 2 year old boy? He's got a fever of 101.8 F and a runny nose. He weighs about 30 pounds. How much vitamin D to give him? I try 2000 IU. His runny nose disappears and his temperature falls from 101.8F to 98.8 F in minutes. Now, when a runny nose appears we give our child up to 15,000 IU per day, without side effect. The assurance this isn't an overdose comes from knowing infection increases the need for vitamin D. Wait till you get over your phobia about high-dose vitamin D and begin using it in your children. It will work wonders.

**Vitamin D tests**

Of course the most accurate way to determine if you are vitamin D deficient is to obtain a blood test.

You should ask for a 25-hydroxyvitamin D test (25OHD). However, be aware this test is not standardized yet in laboratories throughout the USA. Several methods are available for measuring the circulating concentration of 25OHD, and there may be significant differences in test results from one lab to the next. Using one type of test, labs can vary from 41 to 96 micrograms/Liter for 25OHD. [Clinical Chemistry 2008; 54: 221-23]

A blood level of 25-hydroxyvitamin D of at least 20 nanograms/milliliter is considered to be vitamin D sufficient. [Southern Medical Journal 2005; 98: 1024-27] But this is actually the border of deficiency. A more up to date definition of vitamin D deficiency is a circulating level of 25OHD of 80 nanomoles or 32 micrograms per liter. [Journal Nutrition 2005; 135: 317-22]

Remember, you should be shooting for optimal health levels of vitamin D, not just barely-adequate levels. According to the following chart, it would require more than 5000 IU of vitamin D3 per day to achieve the healthy levels of vitamin D observed among farmers and lifeguards.

The problem with blood tests is that they often are confusing and people simply look to see if their vitamin D number is in the "normal range." This proposed vitamin D deficiency set point, 80 nanomole, or 32 micrograms per liter, is much higher than the 25 nanomole/liter or 10 micrograms per liter value recognized by most physicians, assay manufacturers, and clinical chemistry laboratories. Why should any blood test indicate a person's vitamin D level is within normal limits when "normal" is under the level needed to keep bones from breaking (~74 nanomole per liter)?? [Journal Nutrition 135:317-322, February 2005]

Assume for a moment that your starting level of vitamin D is ~30 nanomole per liter. If you supplement with 400, 1000, 5000 IU per day for 5 months, theoretically you would increase your blood levels by 7, 17.5 and 70 nanomole, respectively. So a 5000 IU oral dose, equivalent to 15-minutes of full-body sunshine exposure, may produce a blood concentration of ~37 + 47.5 = ~85 nanomole per liter, or starting to approach the level observed in farmers and lifeguards. [Journal Nutrition 135; 317-22, 2005]

The data show that for every 40 IU (1 microgram) of vitamin D3 intake, circulating 25OHD levels increase by 0.70 nanomole/Liter (0.28 micrograms/Liter) over 5 months on a given regimen. Typical blood serum concentrations of vitamin D\*

\*There are wide variations due to geographic latitude, skin pigmentation, thickness of skin (advanced age), and poor absorption of oral vitamin D.

Natural sun or daily vitamin D supplement	Blood concentration (nanomole/liter)
Farmers (sun only)	135

Lifeguards (sun only)	163
2000 IU supplementation	75 (would only be achieved by 10-15% of persons)
4000 IU supplementation**	75 (achieved by 88% of young men and women)
5000 IU supplementation	Represents ~15-20 minutes of midday sun exposure
6400 IU supplementation	Optimal intake for lactating females
10,000 IU supplementation	Considered safe for most adults- new upper safe level
Toxicity (hypercalcemia)	220
Source: American Journal Clinical Nutrition 2006; 84: 18-28.	
** The lowest average serum vitamin D concentration in any study that demonstrated fracture reduction is 74 nanomole per liter, or greater than 4000 IU per day vitamin D3.	

### What is the optimal dose of vitamin D for health?

A smart group of researchers attempted to determine the optimal vitamin D intake, considering a wide range of applications – for bone health, prevention of adult tooth loss, muscle tone, and colon health. When all of these health concerns are considered, a blood serum concentration of 90-100 nanomole/Liter, or 36-40 nanograms per milliliter, would be desired for most people. This blood concentration would not be reached with the current recommended intakes of 200 IU and 600 IU for younger and older adults.

If 1000 IU were consumed, while at least 50% of the population would achieve a 75 nanomole/liter level, this would still leave millions of people suffering from health problems related to a shortage of vitamin D.

Recommendations for vitamin D intake are largely made for healthy adults. Growing children, dark-skinned individuals, overweight individuals, and the elderly obviously need more. For people living in northern climates, there is also greater need. So a single number is difficult to prescribe across the board for everybody. [American Journal Clinical Nutrition 2006; 84: 18-28]

For example, a recent study suggests 6400 IU of vitamin D3 for lactating women to achieve optimal vitamin D status. [Journal Steroidal Biochemistry Molecular Biology, Jan 9, 2007]

For short-term use, such as when challenged by the common cold, higher doses can be used.

### Vitamin D supplements to the rescue, maybe

So, just how are you and your family going to obtain the recommended 30 minutes of sunshine, daily? [Journal Florida Medical Association 1989; 76: 1035-36]

Vitamin D supplements represent “*sunlight in a bottle*” and provide vitamin D without the accelerated skin aging or concerns about skin cancer associated with sun exposure.

However, in one study, 54% of adults taking vitamin D supplements still had sub-par vitamin D levels. [Internal Medicine Journal 2007; 37: 377-82] This is because most multivitamin provide only 400 IU of vitamin D3.

Also, some supplements provide the inferior vitamin D2 (ergocalciferol), which is not preferred. [American Journal Clinical Nutrition 1998 Oct; 68(4):854-8] Some experts consider vitamin D2 unsuitable for food fortification or supplementation. [American Journal Clinical Nutrition 2006 Oct; 84(4):694-7]

Dark-skinned individuals obviously need more vitamin D than is provided in 99% of dietary supplements. [American Journal Clinical Nutrition 2007 Dec; 86(6):1657-62] Women who have long term deficiencies, specifically women with naturally dark skin pigmentation, need much more vitamin D than light skinned women, perhaps 10 times as much. Like 10,000 units per day.

In 2005 vitamin D researchers at the Bone Mineral Research Center at Winthrop University Hospital in New York reported that 2000 units of supplemental vitamin D failed to increase bone mineral density among vitamin-D deficient black females. [Archives of Internal Medicine July 25, 165: 1618-23, 2005] Women in this study were deficient **before and after** supplementation. The women in the study taking 2000 units of supplement vitamin D daily achieved a blood concentration of about 48 nanomole per liter of blood. The lowest average serum vitamin D concentration in any study that demonstrated fracture reduction is 74 nmol per liter. [Annals Medicine 37: 278-85, 2005; Osteoporosis International 16: 713-16, 2005]

If attempting to acquire vitamin D from the sun, blacks, especially those who live in northern latitudes where vitamin D production is nil from sun/skin exposure, need more vitamin D, maybe ten times more sun exposure than light-skinned people.

Advantages of vitamin D supplements are they are economical, do not promote premature aging and wrinkling of skin like solar UV-radiation does, can be taken in wintertime when sun exposure at northern latitudes produces zero vitamin D, and may be amenable to the infirm or even busy adults who can't easily obtain midday sun on a regular basis. A current disadvantage is that the supplement industry is intimidated by the National Academy of Sciences 2000 IU absurd upper safe limit. It's difficult to locate a vitamin D3 pill with more than 1000 IU in it. There are some higher-dose vitamin D pills now becoming available.

#### **What about vitamin D and autoimmune disease?**

If there is a subset of human beings who may not react positively to sunlight exposure it may be people with autoimmune disorders. These include people with rheumatoid arthritis, Type I diabetes, lupus, Hashimoto's thyroiditis, multiple sclerosis and Crohn's disease.

In autoimmune disorders, the immune system attacks target tissues. Therefore, enhancement of immune response may worsen autoimmune problems. This was documented recently in a 34-year old woman with lupus skin problems who had been in remission for 7 years without treatment. Six weeks following acute sunburn she developed kidney inflammation with acute autoimmune reaction. [Annals New York Academy Science 2007; 1108: 35-40]

Another disturbing report shows that a chronic muscle and skin inflammatory condition known as dermatomyositis occurs three times more frequently near the equator, where vitamin D-producing solar UV-B rays are most intense. [Environmental Health Perspectives 2003; 111: A634]

Many people with autoimmune issues avoid the sun, particularly those with skin disorders like lupus. [Autoimmunity 2005 Nov; 38(7):519-29] However, it is also recognized that, due to sun avoidance and use of steroid drugs that interfere with vitamin D metabolism, lupus patients are at higher risk for osteoporosis (bone loss) and fractures and vitamin D supplementation is recommended for this condition. [Lupus 2004; 13(9):724-30]

Perplexingly, there is a growing body of reports which show vitamin D may be an antidote for autoimmune disease. Experimentally, vitamin D deficiency results in the increased incidence of autoimmune disease. [Experimental Biology Medicine 2004; 229: 1136-42]

For example, rheumatoid arthritis is an autoimmune condition that is more prevalent in less sunny areas (northern latitudes). The lack of vitamin D is implicated. [Autoimmune Review 2007; 7: 59-64] Optimal vitamin D supplementation early in life appears to ward off Type I diabetes. [Pediatric Diabetes 2007; 8: 6-14] There is evidence that vitamin D may be beneficial in multiple sclerosis and inflammatory bowel disease. [Progress Biophysics Molecular Biology 2006; 92: 60-64]

A common thread in autoimmune reactions may be mycobacterial infection. Mycobacteria can attack various organs, such as the pancreas, inducing Type I diabetes. [Medical Hypotheses 2006; 67: 782-85] What is interesting about mycobacteria is that they reside in the human body in macrophages, the very white blood cells that respond to infection. So it could be that when vitamin D stimulates the immune system, it also increases the delivery of mycobacteria to tissue. [Proceedings National Academy Science U S A. 2007 Jun 26; 104(26):11038-43] Vitamin D, by upregulating the immune system, could induce what is called a cytokine storm, a wave of inflammation. [Cytokine 2007; 40: 128-34] However, vitamin D also appears to normalize, rather than over-stimulate the immune system. For example, in experimental models of multiple sclerosis, vitamin D calms the cytokine storm. [Journal Neuroscience Research 2007 Aug 15; 85 (11):2480-90]

Individuals with autoimmune disorders who avoid the sun and take steroidal anti-inflammatory drugs may certainly need supplemental vitamin D to prevent deficiency.

### **Impact of vitamin D supplementation**

The health effects of vitamin D are so broad that Michael Holick MD, noted Harvard-based vitamin D researcher, has said that we don't know the level of remaining disease in developed countries after vitamin D sufficiency is achieved. Should vitamin D be adequately fortified in the American diet, the medical care industry would be forced to downsize significantly.

Dr. Armin Zittermann of the University of Bonn, Germany, in regard to vitamin D, asks: "*Are we ignoring the evidence?*" [British Journal Nutrition 2003; 89: 552-72] It's very possible modern medicine would rather treat disease than prevent it. Since vitamin D may vanquish the leading causes of death – heart disease, cancer and infection – as well autoimmune disorders, bone loss, dental caries, and a host of other maladies, this ten-cent vitamin D could be perceived as a threat to the economic growth of the medical industry. This could explain why it has taken more than eight decades to uncover its incomparable health benefits.

Cost of vitamin D is not much of an issue. It is very inexpensive to acquire a 5000 IU vitamin D3 tablet, about 7 cents a day! However, the best way to ensure delivery of this vitamin to every person would be food fortification. This is already practiced – the existing "I.I." (inadequate intake) level prevails in fortified milk, thus ensuring a certain level of disease in the population at large.

Nearly everyone in northern Europe is deficient in vitamin D. European health authorities convened in 2000 (the Optiford Project) to optimize vitamin D fortification in the northern European Countries. It's 8 years later and still most European countries limit vitamin D in foods and supplements to 200 IU per day, a level that ensures deficiency. Individuals are required to secure a prescription from a physician in order to obtain a vitamin D preparation that contains more than 200 IU (greater than 5 micrograms). [Journal Nutrition 136:1130-1134, April 2006]

It may be no coincidence that Finland has the highest incidence of Type I diabetes in the world and the lowest amount of allowable vitamin D in foods. This in a country where, in northern areas, there are just a few hours of sunlight in an entire winter month.

Despite all of the evidence provided herein, consumers are still likely to stand in disbelief that vitamin D has been withheld from the population for no good reason. Certainly vitamin D is not without side effect at all possible dosages.

However, imagine a country made a mistake and set the recommended dose for vitamin D too high? Let's just say, for the sake of an example, 5000 IU for small infants! Why that would be equivalent to 100,000 IU in a 200-pound adult male.

Just such a thing happened in Finland. From the mid-1950s to 1964 the recommended intake of vitamin D for infants was 4000-5000 IU (100-125 micrograms) per day! In 1964 it was reduced to 2000 IU (50 micrograms) and then in 1975 to 1000 IU (25 micrograms), and then again in 1992 to the US RDA level of just 400 IU (10 micrograms). The dosage of vitamin D was reduced for no good reason.

Guesstimates of daily need for vitamin D supplementation, IU (International Units)												
	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	20000	50000
Childhood	Healthy Childhood					Short-term Illness During Childhood						
Adulthood	Healthy Adult					Short-term Illness During Childhood						
Dark skin				Healthy adult			Short-term Illness During Childhood					
Pregnancy, lactation				Healthy gestation & lactation					Short-term Illness			
Late adulthood				Healthy Senior Adult			Short-term Illness					

There were no reported cases of over-calcification or any other health problems ever described. To the contrary, what resulted was an epidemic of Type I diabetes in Finland from the low-dose vitamin D. [American Journal Clinical Nutrition 2004; 79: 717-26] Did somebody in Finland figure out how to keep doctors busy by limiting the amount of vitamin D?

Every person on the planet needs to heed the new scientific breakthroughs regarding vitamin D if they want to live long and healthy. The problem is, at every turn, the public is misled about vitamin D.

Just how can you and your loved ones get 30 minutes of sunshine every day? Thirty-minutes of midday summer total-body sunshine would produce about 10,000 IU (250 micrograms) of vitamin D3. But let's assume a person is partially clothed. So, as a guesstimate, let's say around 4000-5000 IU of natural vitamin D3 is produced from 30 minutes of midday summer sun with some skin exposed. A good rule of thumb for adults is about 5000 IU of vitamin D per day and more when seriously ill. For small children, their growth requirements and lack of a fully-developed immune system demand more vitamin D than public health agencies now recommend, and certainly much higher levels for short periods of time when ill. Maybe 1000-2000 IU for kids on a daily basis. But again, recognize kids are growing and need more. Fortunately, children spend a lot of time outdoors.

The vitamin D revolution has to be a grass roots effort. Health authorities aren't suddenly going to stop dragging their feet. Lobbying efforts will only throw the subject to a committee that will endlessly debate the issue, like they have in Europe. Pity the people who never hear this message. #####

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### Factors That Increase The Need And Dosage For Vitamin D Supplementation

- ✓ Northern geographical location- above 40° North latitude (Denver, Philadelphia)
- ✓ Dark skin pigmentation
- ✓ Advanced age- thickened skin reduces vitamin D production in the skin
- ✓ Little time spent outdoors, midday sun (10 AM – 3 PM are peak vitamin D-producing hours; very little vitamin D is produced during other hours)
- ✓ Autumn, winter season
- ✓ Illness – infection, viruses (short-term)
- ✓ Medications – antacids inhibit vitamin D absorption from foods
- ✓ Pregnancy and lactation
- ✓ Childhood growth – for bones, teeth, immunity
- ✓ Autoimmune disorders
- ✓ Blood concentrations below 80 nanomoles or 32 micrograms per liter