

Life Extension Magazine December 2009

## REPORT

### Are You Getting Optimal Flu Prevention?

By Julius Goepp, MD

As numerous *strains* of the influenza virus continue to pose a deadly danger to the public health—especially among aging individuals—a potent, low-cost defense has been hidden in plain sight: **vitamin D**.

The work of several pioneering experts suggests that at sufficient levels, its capacity to *supercharge* the immune system can **virtually eliminate the risk of infection**. Their findings also underscore the extraordinary inadequacy of the current “recommended” dose of 400-800 IU/day. To get the full immune-boosting benefit, about **ten times** that amount may be required to achieve optimal blood levels of vitamin D in its active *form*.<sup>1</sup>

Mainstream medicine’s persistent failure to recognize and ensure adequate D levels has resulted in *epidemic* deficiency—**87%** of adults by recent estimates. <sup>2,3</sup> Given seasonal flu viruses’ ability to endlessly mutate, and the **exorbitant** cost to the public for each new round of vaccination, this persistent “oversight” borders on the criminal.

In this article, you will find compelling evidence that vitamin D provides unrivaled support for the **innate** immune system: the foundation of your body’s defense that is hard-wired to respond *instantly* to microbial invasion.<sup>4</sup>

You will also discover how you may be getting the wrong test to determine your vitamin D status—and the right steps to take for maximum immune support.

#### AN “ACCIDENTAL EXPERIMENT”

The recent work of **three exceptional physicians** illustrates vitamin D’s vastly underreported preventive power.

Dr. John Cannell’s “accidental experiment” with vitamin D took place in 2005.<sup>5</sup> A psychiatrist based at a locked facility in California, Cannell found himself confronted with a particularly severe outbreak of seasonal influenza that year. A substantial number of inpatients were infected—and most of the wards were forced into quarantine. By contrast, **not one** of the 32 patients in Dr. Cannell’s care developed flu symptoms.

The reason soon came to light. In contrast to those in the rest of the hospital, his patients’ treatment regimen included **high-dose vitamin D**. Dr. Cannell knew its critical role in the optimal functioning of multiple systems in the body. He was also aware that his patients were unlikely to get the amount of sunlight required to support healthy vitamin D levels on their own.<sup>6</sup> (Vitamin D synthesis requires exposure to ultraviolet light from the sun.)

The **100%** rate of flu protection was unexpected, and it prompted Cannell to perform further research. After exploring the scientific literature and consulting with experts, Cannell and his colleagues developed a novel theory: influenza is seasonal because of seasonal variations in sunlight, which cause natural fluctuations in vitamin D levels.<sup>4,7</sup>

That initial exploration has now led to a wealth of scientific support, including compelling data on exactly how vitamin D dramatically increases immunity to many infectious diseases. It has also led other physicians to include D supplementation as part of their standard treatment regimen.

Norris Glick, MD, is Director of Rehab Services at Central Wisconsin Center, a long-term care facility for people with



developmental disabilities, with 275 residents and 800 staff members. Like Dr. Cannell, Dr. Glick monitors his patients' vitamin D and supplements them to maintain adequate levels. In a published letter to Dr. Cannell, Dr. Glick reported that during the **H1N1 ("swine flu")** outbreak of June 2009, only two patients (0.7%) developed influenza-like symptoms.<sup>8</sup> During the same period, 103 staff members (7.5%) developed influenza-like illnesses—a 10-fold difference. Dr. Glick concluded that "staff were susceptible [to infection] while our residents were protected." Sadly, when Dr. Glick presented these findings to the state agency charged with "protecting and promoting the health and safety of the people of Wisconsin",<sup>9</sup> he was unable to generate interest in studying them further.<sup>8</sup>

Dr. Ellie Campbell, an integrative family medicine practitioner in Georgia, where widespread H1N1 outbreaks have been reported, outlined similar findings in September 2009.<sup>8</sup> Campbell measures and replenishes vitamin D in her patients, while the family physician who shares her office does not. During the 2009 outbreak, he was seeing up to 10 cases per week of influenza-like illness, while Campbell had seen just one over the same period.

Campbell attributes this striking contrast in infection rates to her patients' vitamin D status. "I'm a prevention doctor, and I don't have a tool in my kit more powerful than vitamin D," she says. "I test virtually all of my patients every three to six months for vitamin D status," Campbell continues, "and I aim for a vitamin D 'sufficiency' level of 50-80 ng/mL." Like many vitamin D-aware physicians, Campbell considers **levels below 30-40 ng/mL** to be *insufficient*.<sup>10-13</sup>

Drs. Cannell, Glick, and Campbell achieved these superior results through their knowledge of vitamin D's powerful impact on the **innate immune system**.

## BOLSTERING THE BODY'S FUNDAMENTAL DEFENSES

The **innate immune system** is the branch of the immune system that responds immediately to dangerous microbes.<sup>4</sup> As soon as an invasion is detected, the innate immune system releases virus-killing compounds called **antimicrobial peptides (AMPs)**.<sup>14-17</sup> The tissues that line our air passages are especially rich in AMP-producing cells, where they provide a front-line defense against influenza.<sup>16-20</sup>

Only in the past few years have scientists discovered that these cells **require** vitamin D to function effectively.<sup>4,20-23</sup> Vitamin D acts by **modulating gene expression**—activating the genes that govern AMP production.<sup>15,18-25</sup> Respiratory tract cells convert vitamin D into its active form—reflecting the intimate relationship between vitamin D and host defenses.<sup>18</sup>



Vitamin D also suppresses inflammatory **cytokines**.<sup>4,25-27</sup> Cytokines are partly responsible for the pain, fever, and congestion that comes with influenza infection; full-blown **cytokine storms** are to blame in some fatal cases of influenza.<sup>4,28</sup> Vitamin D not only enhances our ability to produce AMP molecules, it also simultaneously dampens the acute inflammation that causes most of our symptomatic misery during a bout of influenza.<sup>4</sup>

While the underlying mechanisms behind vitamin D's immune-supporting action have only recently come to light, scientists have long suspected that vitamin D protects against influenza and other respiratory infections. Influenza is highly seasonal, of course, occurring during months of relative darkness in both hemispheres (both through fewer daylight hours and greater cloud cover). Since vitamin D requires sunlight for activation, researchers suspected a connection.<sup>7,29,30</sup>

An early study demonstrated that mice with low vitamin D levels were at higher risk for experimental swine flu.<sup>31</sup> Numerous studies have shown that infants, children, and adults are at increased risk for influenza and other serious lower respiratory infections when their vitamin D levels *decline*.<sup>32-36</sup> One 2009 study found that risk was **36% greater** for healthy people with vitamin D levels **below 30 ng/mL**, and **126 to 467%** greater for those with **chronic obstructive pulmonary disease** or **asthma**, respectively!<sup>37</sup>

## WHAT YOU NEED TO KNOW: OPTIMAL FLU PREVENTION

- Epidemic seasonal influenza strikes every year, while the recent H1N1 "swine" flu has spread with alarming speed.
- Immunizations can help, but they may not actually *reduce* mortality rates from the flu.
- Vitamin D has powerful immune-boosting properties, upregulating genes for vital antimicrobial peptides that can kill influenza viruses as soon as they land in our airways.
- To optimize vitamin D's immune-enhancing effects, most individuals must take far higher supplement doses than are usually recommended.
- Practicing clinicians have achieved efficacy with daily vitamin D supplements of **5,000 IU** or higher—virtually eliminating influenza infections even among vulnerable populations.
- **Start vitamin D supplementation today.** Get your levels checked twice a year to be sure you are reaching optimal

levels to support your immune system.

A 2005 placebo-controlled study revealed a direct link between vitamin D supplementation and flu prevention.<sup>38</sup> Researchers studying a group of postmenopausal women at risk for osteoporosis administered the recommended 800 IU per day of vitamin D<sub>3</sub> for the two years, then 2,000 IU per day in the third year, vs. placebo. While **26** placebo recipients reported having a cold or influenza-like illness during the study, only **7** taking the 800 IU supplement had such an illness—and **only one** such illness was reported during the 2,000 IU period. Even more unexpectedly, the supplement **completely** cancelled out the seasonality of infection—there was no big “flu spike” in winter among the supplemented patients.<sup>11</sup>

These results provide ample evidence that the immune system requires vitamin D in relatively high quantities to provide adequate protection against the flu (including H1N1 swine flu). The problem is that even if you take vitamin D supplements, **you may still not be getting enough.**

### WHY YOU AREN'T GETTING ENOUGH VITAMIN D

The current “recommended” daily amount of 400-800 IU was established *more than 30 years ago*—and it was aimed purely at establishing the minimum required to avoid osteoporosis.<sup>39</sup> These amounts are far too low to provide vitamin D at immune-supporting levels.<sup>40</sup> The body can *produce* blood levels of activated vitamin D in far greater amounts than we normally *ingest*.<sup>11</sup> In order to generate any significant benefit, researchers had to give **6,400 IU** of vitamin D to healthy adults in order to maximize production of the active *form*.<sup>10</sup> As Dr. Cannell reported, “This implies that everyone has a chronic vitamin D deficiency, at least in the winter,” when flu is at its worst.<sup>11</sup>

Recent studies support Cannell’s observation, demonstrating that as many as **87%** of adults are vitamin D deficient by late winter—and **61%** remain deficient even during the sunny summer months.<sup>2,3</sup> Many factors contribute to these low levels. Age decreases the ability of human skin to activate vitamin D.<sup>41</sup> Pollution and cloudy skies cut down on the amount of sunlight available for natural vitamin D activation, as does living in the temperate zones where total sunlight levels are only moderate.<sup>42,43</sup>



According to nutritional expert Reinhold Vieth, “Human biology was probably optimized through natural selection for a sun-rich environment that maintained serum vitamin D higher than 40 ng/mL. These levels are now only prevalent in people who spend an above-average amount of time outdoors, with the sun high in the sky.”<sup>44</sup> Vieth continues, **“The combined effect of current nutrition guidelines and current sun-avoidance advice is to ensure that adults who follow these recommendations will have circulating vitamin D concentrations lower than 30 ng/mL.”**

Experts who have devoted their lives to the study of vitamin D conclude that the lower end of the current RDA is far too low.<sup>5,13,45</sup> Studies show that you need at least 2,200 IU vitamin D daily total and probably much more, in order to come anywhere close to optimizing vitamin D status for real immune support.<sup>46</sup> Yet most doctors are not recommending supplementation greater than 800 IU!<sup>11</sup>

# REPORT

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### OPTIMIZING YOUR VITAMIN D STATUS

According to Dr. Cannell: “Healthy humans should be supplemented with enough vitamin D or exposed to enough ultraviolet B radiation to achieve natural activated vitamin D levels of 40-70 ng/mL.”<sup>11</sup> Dr. Campbell aims for even higher levels of 50-80 ng/mL.<sup>8</sup> Testing for vitamin D status is of course the first and crucial step.

“I tested everyone in my practice a few years ago,” says Dr. Campbell, “and found that in summer **55%** were deficient, rising to **76%** in winter.” Campbell, like other experts, defines deficiency as levels below **30 ng/mL**, and insufficiency as levels between **30** and **50**. Cannell elaborates: “Even without physical signs or symptoms, the physician should screen those at risk” at least twice yearly.<sup>11</sup>



These experts also caution that many physicians and labs perform the wrong test. Most labs measure only levels of the kidney-modified 1,25 dihydroxy-vitamin D, which do not correlate to actual vitamin D deficiency.<sup>11</sup> The correct test to obtain, and on which to base supplementation, is for **25-hydroxyvitamin D** (often abbreviated “**25(OH)D**” on laboratory order forms). Be sure you get tested at least once in late winter and once in late summer, and be certain that your doctor orders the correct 25-hydroxyvitamin D test. You do not have to wait for test results before starting on at least a reasonable maintenance dose of vitamin D. The supplement is safe and it’s important to get started on adequate coverage right away.

Many different forms of vitamin D are available, and in many doses. Our experts unanimously recommend using **vitamin D3**. Like them, you and your doctor may at first be shocked at the amount you’ll require to bring your blood level up to the 40-50 ng/mL range. Cannell and others calculate that to raise serum vitamin D levels by 10 ng/mL requires daily supplementation of a minimum of 1,000 IU over three to four months.<sup>11</sup> That means that if your initial level was 10 ng/mL, you’d need to take 2,000 IU over that period just to reach 30. Cannell and Campbell caution that the response rate is not linear. That is, it may be easy to raise initially low levels into the existing normal range, but you may require larger amounts to achieve the 40-50 ng/mL minimum that they recommend.<sup>7,8</sup> Furthermore, dark-skinned, older, and large or obese people often require **higher doses** than do fair-skinned, small, thin, or young ones.<sup>39,47</sup>

Both Drs. Campbell and Cannell recommend an **initial loading dose** for people found to have low levels. As one option, Cannell and others recommend **oral** loading doses of 50,000 IU (1.25 mg) of vitamin D3 per day for a week (two weeks at most), before beginning maintenance therapy.<sup>11,48</sup> Given the incredibly high rate of vitamin D-deficient patients in her practice, Dr. Campbell has developed an aggressive initial approach. “I give an intramuscular injection of 400,000 IU of vitamin D3 to my patients whose levels are less than 32 on a first test, or less than 35 if they actually show symptoms such as fatigue, fibromyalgia, or bone pain,” Campbell reports. That apparently huge dose is well-supported by international authorities; injections of up to 600,000 IU have been given with excellent result—and no side effects.<sup>1</sup> Please note that these high doses were administered under a doctor’s supervision. If considering such mega-dosing, we suggest that you do so in concert with your health practitioner.



Regarding **maintenance therapy**, Cannell notes that daily 2,000 IU supplements for one year failed to achieve a 32 ng/mL concentration in 40% of women in one study.<sup>11,49</sup> And **4,000 IU/day** for more than six months achieved an acceptable levels of 44 ng/mL with no side effects other than improved mood.<sup>11,50</sup> “Current evidence suggests that healthy adult men utilize up to **5,000 IU** of vitamin D per day, if it is available,” observes Cannell.<sup>11,51</sup>

Dr. Campbell bases her maintenance therapy on patients’ size, age, skin color, and the results of repeat testing after the loading dose. “My patients typically require 2,000 to 7,000 IU per day, averaging 5,000,” she says. “I re-test my patients at three- to six-month intervals, and adjust the dosing as needed to maintain their levels in the 50-80 ng/mL range,” Campbell concludes. Do people ever exceed the upper limit? “It has happened rarely,” says Dr. Campbell. “I just have them skip doses on weekends for a few months, and test again at the regular interval.” That approach has returned everyone to the healthy range, she reports.

The Food and Nutrition Board identifies the Tolerable Upper Limit of Vitamin D intake as 2,000 IU per day. Nevertheless, they acknowledge that many nutrition scientists have challenged these limits, as far back as 1997. A 2007 risk assessment conducted by the Council for Responsible Nutrition and published in the *American Journal of Clinical Nutrition* found that, in healthy adults, the data support a tolerable upper limit as high as 10,000 IU/day.<sup>52</sup>

Meanwhile, Dr. Cannell and others also recommend **periodic urine testing** for calcium in patients taking high-dose vitamin D.<sup>11</sup> This helps detect the relatively rare cases of excessive calcium uptake that can occur with higher levels of vitamin D supplementation. Virtually no other side effects have been detected in studies to date.

Perhaps the best evidence of how vitamin D helps individuals ward off the flu lies in Dr. Campbell's records. "Three years ago I was ordering 200 doses of **flu vaccine**. I ordered a hundred last year, and this year I've needed none. Maybe they are getting vaccinated somewhere else, but my guess is that they are simply realizing the benefit of adequate vitamin D protection."

These doctors suggest that you should not skip immunizations for either seasonal flu or H1N1 "swine" flu—they remain an important part of overall public health protection. However, when properly taken and monitored with a simple blood test, vitamin D affords powerful, clinically supported immune protection.

## SUMMARY

Vitamin D wards off the flu by ramping up the body's **innate immune system**. Influenza (both seasonal and H1N1 "**swine flu**") and other respiratory infections kill thousands of Americans each year, and hospitalize hundreds of thousands more.<sup>52,53</sup> Despite increasing availability of flu vaccines, **mortality rates** among the elderly may not be dropping.<sup>54</sup> At the same time, **vitamin D deficiency is epidemic**, owing to inadequate sun exposure and incredibly low levels of dietary intake.<sup>55</sup> Compelling evidence supports vitamin D supplementation at much higher levels than are currently recommended by the medical establishment.

*If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-864-3027.*

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