

## **Evidence that Vitamin D Combats Winter Infections**

As daylight hours grow colder and shorter, incidences of the common cold, flu, and respiratory infections spike upwards. Scientists have identified reduced vitamin D levels in winter months as a prime suspect for this increase in infectious disease cases.

Vitamin D in all forms (sunlight, sun lamps, or supplements) reduces the incidence of respiratory infections.[24,26] Dutch children with the least sun exposure are twice as likely to develop a cough and three times more likely to develop a runny nose compared with children with the most sun exposure.[35]

When Russian athletes were given access to a sun lamp to stimulate vitamin D synthesis in the body, there were 50% fewer respiratory infections and 300% fewer days of absence.[26]

Children with the lowest vitamin D serum levels are 11 times more likely to develop respiratory infection. When 60,000 IU per week of vitamin D was administered (for six weeks) to children with frequent respiratory infections, the result was a complete disappearance of such infections in the following six months.[36]

In a controlled trial of African women, a low dose (800 IU a day) of vitamin D resulted in a 3-fold reduction in cold and flu symptoms compared to those given placebo.[37]

Influenza kills between around 36,000 Americans each year[38]. Ensuring optimal vitamin D status could slash influenza incidence and mortality.

## **How Vitamin D Boosts Immune Function and Suppresses Inflammation**

Flu viruses (including swine flu) induce a massive inflammatory response that can kill the victim. In other words, it is not the virus that often kills, but the body's hyper-reaction to the virus—in the form of uncontrolled over-production of pro-inflammatory cytokines. Vitamin D down-regulates the expression of pro-inflammatory cytokines such as tumor necrosis factor-alpha. [39]

As people age, they often over-express these same destructive pro-inflammatory cytokines. The result is chronic low-level inflammation that damages aging arteries, joints, and neurons[40-44]. By down-regulating excess pro-inflammatory cytokine production, vitamin D could save the lives of those stricken with acute

influenza, or the dozens of inflammatory diseases that afflict millions of aging Americans each year.

Antimicrobial peptides are components of the immune system that protect against bacterial, fungal and viral infections. Secreted by immune cells throughout the body, antimicrobial peptides damage the outer lipid membrane of infectious agents (including influenza viruses), rendering them vulnerable to eradication.

Recent studies confirm that vitamin D dramatically up-regulates the expression of these antimicrobial peptides in immune cells[45]. We now have a definitive biological mechanism to explain why vitamin D confers such dramatic protection against common winter illnesses.

### **What are minimum vitamin D blood levels?**

When blood is tested to assess vitamin D status, what is actually measured is the metabolically active 25-hydroxyvitamin D form of the vitamin in the serum.

When data emerged about vitamin D's role in preventing disease, experts initially recommended a minimum target blood level of 30 ng/mL of 25-hydroxyvitamin D.

In recognition of findings showing reduced incidences of disease in those with higher vitamin D levels, the standard laboratory reference range for 25-hydroxyvitamin D was raised to 32-100 ng/mL.

Based on recent and conclusive published studies, the new minimum target level for optimal disease prevention is over 50 ng/mL of 25-hydroxyvitamin D.[46-51]

A startling 36%[52-55,56] of the general population has 25-hydroxyvitamin D levels below 20 ng/dL, which may represent the world's leading cause of unnecessary disease and death.