

Breathing Easier with Vitamin D

Janet Raloff

Most people associate vitamin D, the sunshine vitamin, with strong bones. But studies in the past few years have linked this essential nutrient to a bonanza of additional benefits—from fighting cancer and diabetes to strengthening muscles. Physicians in New Zealand have now linked the vitamin to yet one more apparent advantage: improved lung function.

Peter N. Black is a University of Auckland internist with a research interest in chronic obstructive pulmonary disease (COPD)—a category including diseases most people know as emphysema and chronic bronchitis. Classic signs of COPD are holes in lung tissue where inflammatory enzymes have homed in to destroy diseased cells. Although COPD is common in cigarette smokers, not all smokers develop this disease.

Scientists know that enzymes called matrix metalloproteinases play a role in creating COPD's lung damage. Since laboratory studies had indicated vitamin D could inhibit production of these enzymes, Black wondered if people who got plenty of the vitamin through sun exposure or supplements might be protected from the disease. So, he and colleague Robert Scragg decided to mine data on vitamin status and lung function for 14,000 U.S. residents—a nationally representative sample—who had participated in the National Health and Nutrition Examination Survey (NHANES).

In the December *Chest*, the researchers report that getting ample vitamin D doesn't prevent COPD, but it does appear to help people with and without this lung disease to breathe easier and more deeply. Indeed, Black told *Science News Online*, "We were taken aback at how large the effect was." The study showed that people who never smoked but who were getting little vitamin D had 35 percent worse lung function than did former smokers who were getting adequate amounts of the vitamin. Current smokers, regardless of their vitamin D intake, had worse lung function than did either of these groups.

Blow hard

To measure lung function, NHANES researchers had men and women blow as much air as they could, as fast as they could, into a device. The tool gives two readings: how much air a person forces from his or her lungs in the first second after starting to blow, a parameter known as forced expiratory volume in 1 second (FEV₁), and the total volume expelled, known as forced vital capacity (FVC).

The two measures are related, but in people with lung disease, one may fall more than the other. For instance, in people with asthma, FEV₁ falls more than FVC. The opposite is true in people who have lung fibrosis, essentially the development of scar tissue.

For their study, Black and Scragg grouped the NHANES participants into five roughly equal-size groups on the basis of how much vitamin D was in their blood. The group with the lowest D had no more than 40.4 nanomoles of the

vitamin per liter (nmol/l) of blood, whereas the group with the highest concentration had at least 85.7 nmol/l.

Recent studies have suggested that the optimal vitamin D blood concentration for most adults is at least 75 nmol/l and that elderly people might need at least 100 nmol/l (see [Vitamin D: What's Enough?](#)). In the NHANES analysis, fewer than 40 percent of people had D blood concentrations of at least 75 nmol/l.

Mona Calvo of the U.S. Food and Drug Administration has coauthored studies reviewing people's vitamin D status in North America. She defines vitamin D deficiency as less than 37.5 nmol/l, a value that especially people of color fail to achieve in the United States. Presumably, this reflects the fact that dark skin blocks absorption of much of the ultraviolet light that a person's body needs to make vitamin D (see [Understanding Vitamin D Deficiency](#)).

In the NHANES data, both FEV₁ and FVC correlated with blood-vitamin D concentrations: people in successively higher-concentration groups more strongly expelled air from their lungs. For instance, the average difference between those in the top vitamin group and those in the bottom one was 126 milliliters of air in FEV₁. In absolute terms, that value is small, considering that a healthy person will typically have an FEV₁ of between 3 and 4 liters of air, depending on age and gender.

However, Black notes, the effect of vitamin D on lung function is larger than what other studies have attributed to eating diets rich in fruits and antioxidant vitamins or to most environmental factors other than smoking.

Vitamin D might even slow the reduction in lung function attributable to age or disease, Black notes. Beginning in late middle age, even healthy people begin losing about 20 to 30 ml in their FEV₁ reading each year. In smokers with COPD, the drop in lung function can be 50 to 100 ml/year.

For people with COPD, Black argues, preserving almost 130 ml in breathing capacity "could prove quite meaningful"—extending by several years the period during which they could breathe comfortably, especially during exercise.

He cautions, however, that the new findings are only suggestive. To prove that vitamin D—and not some other related factor—is responsible for the lung benefits, researchers must conduct a large experiment in which half of the participants are administered vitamin supplements or given supervised sun exposures and half aren't, Black says. Until then, he adds, it's too early to advocate vitamin D supplements for the sake of people's lungs. On the other hand, he adds, there are many other reasons—bone health, for instance—for making sure to get plenty of the sunshine vitamin.

Indeed, people with too little vitamin D appear to be paying a toll in health status, according to a trio of researchers from Boston University School of Medicine, the University of California, San Diego, and the San Francisco-based Sunlight, Nutrition and Health Research Center. Their new analysis, reported in the November *Photochemistry and Photobiology*, looked at U.S. incidences of diseases that appear to be higher in people with low vitamin D—blood concentrations—from osteoporosis-linked fractures to certain cancers.

Overall, the researchers calculate, as many as 50,000 people may die prematurely in the United States each year from diseases related to vitamin D deficiency, at an estimated cost to society of at least \$40 billion. That's at least seven times as much as the annual U.S. cost of cataracts and skin cancers attributable to excess sun exposure.

References:

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Further Readings:

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