Comments on Dietary Reference Intakes for Calcium and Vitamin D for the Vitamin D Council

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Background

The Institute of Medicine (IOM) of the National Academies released its new Dietary Reference Intakes for Calcium and Vitamin D report on November 30, 2010.[1] An evidence report had been conducted beforehand by Tufts Evidence-based Practice Center to guide the committee's deliberations:

> "Federal sponsors defined the key questions and a technical expert panel was assembled to refine the questions and establish inclusion and exclusion criteria for the studies to be reviewed." [2]

Those sponsors were:

- Agricultural Research Service
- U.S. Department of Agriculture
- Department of Defense
- Food and Drug Administration (FDA)
- Health Canada
- National Institutes of Health
- Office of Disease Prevention and Health Promotion (HHS)

See: www.iom.edu/Activities/Nutrition/DRIVitDCalcium.aspx

It was determined that studies using the following procedures were to be included in the IOM review:

- Primary intervention or exposure studies measuring serum 25(OH)D or 1,25(OH)2D concentrations - in other words, studies that compare initial blood levels of vitamin D to risk of disease, to see if vitamin D offers protection or prevention.
- Interventional studies using vitamin D supplements requiring identical calcium supplements in both arms of the study - meaning, studies determining if vitamin D has a treatment effect in a certain disease, with one group of patients receiving a placebo plus calcium and the other group receiving vitamin D plus calcium.

- Food sources of vitamin D could be included if quantified.

Importantly, to be excluded were studies using non-oral routes of nutrient delivery - meaning, vitamin D could not be obtained from any means (such as sun exposure) other than pills or through diet.

In contrast, the FDA approves pharmaceutical drugs based on only one good randomized controlled trial!

In terms of study design, pre-defined rules dictated the types of study designs to be reviewed for the purposes of determining the new vitamin D recommendations.

Study design types which could be included were:

- Randomized controlled trials (RCTs).
- Nonrandomized, prospective comparative studies of interventions.
- Prospective, longitudinal, observational studies (where the measure of exposure occurred before the outcome).
- Prospective nested case-control studies (case-control study nested in a cohort so the measure of exposure occurred before the outcome).

Study design types to be excluded were:

- Cross-sectional studies.
- Traditional, retrospective case-control studies (where the measure of exposure occurred after or concurrent with the outcome).

All this resulted in the following types of studies being excluded:

- Ecological studies using indices for solar ultraviolet-B (UVB) doses - in other words, studies comparing latitude of residence or amount of sun exposure received between populations to see if more sun exposure lessened risk of disease.
- Case-control studies with serum 25(OH)D levels measured at time of diagnosis.

The very types of studies which often show a significantly favorable effect of sunlight and/or vitamin D on human health!

What this means

The committee was limited in the studies they could use in their evaluation. They could not use studies in which serum vitamin D was measured at time of diagnosis and they could not consider studies that used ultraviolet-B (sun exposure or tanning bed) as the means by which patients received their vitamin D. Many randomized controlled trials used too little vitamin D (400 IU/day) to result in any beneficial effect.

The health benefits of vitamin D extend to at least 100 types of disease, with the strongest evidence for many types of cancer (breast, colon, ovarian, pancreatic, prostate, and rectal), cardiovascular disease, diabetes types 1 and 2, respiratory infections such as type A influenza and pneumonia, other infections such as sepsis, and autoimmune diseases such as multiple sclerosis.

The level of 25(OH)D (vitamin D) in the blood, which is measured in vitamin D tests, should be at least 40-60 ng/ml for optimal health. White Americans on average have 26 ng/ml, while African-Americans have 16 ng/ml, their darker skin allowing for less vitamin D production from sun exposure.

Raising serum vitamin 25(OH)D levels to 40 ng/ml could reduce mortality rates by 15% in the United States (PDF download) [3], corresponding to a 2-year increase in life expectancy.

Amazingly, a government-sponsored panel could not bring itself to recommend the 1000-2000 IU/day, or more, of vitamin D required by most people to raise the amount of vitamin D in their blood to healthy levels, in spite of all the past decades' research reporting beneficial effects of receiving more than 1,000 IU per day of vitamin D.

However, three high-profile public health organizations – the Canadian Cancer Society, the Canadian Pediatrics Society and Osteoporosis Canada – are sticking to their recommendations [4], even though the doses they suggest exceed – sometimes by substantial margins – the amounts deemed needed in a report by a blue-ribbon U.S.-Canadian panel.

References

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