

## Vitamin D (25-OH-D3) Status of 200 Chronically Ill Outpatients Treated at The Center

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There have been many studies recently concerning the proper amount of Vitamin D (25-OH-D3) that is necessary to combat the many diseases that are now being associated with vitamin D deficiencies. Two studies examined the vitamin D status of hospitalized patients, general population and those admitted to a rehabilitation hospital.<sup>1,2</sup> The study of hospitalized patients found the vitamin D status of sub-optimal to overt deficiency levels to be a common finding. The same findings were found in 51 non-hospitalized volunteers. It also found that sub-optimal levels of vitamin D increased the length of stay (LOS) in hospitalized patients.<sup>1</sup>

A study of 100 patients, men and women with various diagnoses (mean age of 70 years) admitted to a rehabilitation hospital found that 11% of the patients to be overtly vitamin D deficient (<8.0 ng/mL) and “ninety-four percent” of the patients had sub-optimal levels (<32 ng/mL) of vitamin D. A simple, inexpensive treatment with vitamin D (25-OH-D3) could improve the patient’s functional ability, decrease the LOS and dramatically reduce the cost of health care.<sup>2</sup>

The Center only treats chronically ill patients with various diseases on an outpatient basis. Based on geography, most of our patients come from the mid-West. However, patients have come from every state in the U.S. as well as from over 40 foreign countries. To check the finding of sub-optimal or deficient vitamin D in patients with various illnesses, we examined the vitamin D (25-OH-D3) levels that

were ordered on 200 patients seen at The Center over the past four months. The test was performed in our own BioCenter Laboratory ([www.biocenterlab.com](http://www.biocenterlab.com)) using the DiaSorin® R.I.A. method. Reference ranges were established from data collected from our patient population and cross checked with other laboratories.

Table 1 (p.89) shows some of the demographic data and preliminary results. Sixty-six percent of the patients were female and the ages of all patients ranged from 6 to 91 years of age with a mean age of 55 years. Results of the vitamin D tests ranged from 5.0 ng/mL (overt deficiency) to 96 ng/mL. The mean range of the 200 tests was 32.5 ng/mL (sub-optimal). The optimal range of The BioCenter Laboratory is 40 to 80 ng/mL.

Table 2 (p.89) shows the results of patients based on four different classifications. Considering that the minimum optimal range is 40 ng/mL, 152 patients (76%) had less than optimal vitamin D levels. It does appear that the older the patient, the lower the level. One 78-year old female had a value of 5.0 ng/mL; 3 females age 60 and one male age 66 had levels of 6.0 mg/dL. Only 48 patients (24%) had optimal levels of vitamin D.

These data tends to confirm that patients suffering from different disease and older patients have low or sub-optimal levels of vitamin D. It has been shown in many studies that vitamin D deficiency is a contributing factor for hypertension, diabetes, multiple sclerosis, rheumatoid arthritis, insulin-resistance, early age macular degeneration, bone health, depression and cancer.<sup>3,4,5</sup> Most of the patients in this study had one or more of these diseases.

How can this international finding of

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deficient or sub-optimal vitamin D levels be corrected? Plenty of sunshine (UVB) without layers of sunscreen, eating foods high in vitamin D, supplementation with vitamin D, to name a few. The RDA is designed to prevent deficiency diseases such as osteomalacia or rickets, not to maintain good health. The RDA in the U.S. of 400 IU/day is entirely too low to prevent the diseases shown above. The RDA should be at raised to maintain a level of 2000-4000 IU/day.<sup>6,7</sup> This is the amount routinely prescribed by The Center's physicians.

Although the data is too limited to be statistically significant, one other

interesting finding in this study is that in some patients with sub-optimal vitamin D levels, Co-Q10 enzyme levels were also in the low range. Not every patient that had vitamin D test ordered had Co-Q10 ordered. The Co-Q10 test was also performed in our laboratory and the reference ranges are 0.3 to 1.5 ug/mL. **Table 3** (below) There were 41 patients in the sub-optimal vitamin D range. The Co-Q10 tests on these patients ranged from 0.1 to 0.6 - very low. We will examine these data on future patients to determine if there is any physiological and/or biochemical connection between the two tests.

**Table 1.** Data on number, age and vitamin D (25-OH-D3) results on 200 chronically ill out patients.

Number = 200	Age- Years	Results, ng/mL Vitamin D (25-OH-D3)
Females = 132 (66%)	Range = 6 to 91	Range = 5 to 96
Males = 68 (34%)	Mean = 55	Mean = 32.5

**Table 2.** Vitamin D (ug/dL) ranges based on classification of results and gender on 200 patients.

Deficient	Insufficient	Expected Range	Optimal Range
1 to 5.0 ng/mL	6 to 14 ng/dL	15 to 40 ng/mL	> 40 ng/mL
Male = 1 (0.5%)	Male = 5 (2.5%)	Male = 50 (25%)	Male = 12 (6%)
Female= 0	Female = 10 (5.0%)	Female= 86 (43%)	Females = 36 (18%)
Totals= 1 (0.5%)	15 (7.5%)	136 (68%)	48 (24%)

**Table 3.** Comparison of limited numbers of Co-Q10 to sub-optimal vitamin D levels.

Number	12	23	6
Vitamin D Range	12-20 ng/mL	21-30 ng/mL	31-40 ng/mL
Range Co-Q10	*0.1-0.8 ug/mL	.1-1.0 ug/mL	0.1-0.6 ug/mL
Mean Co-Q10	0.3 ug/mL	0.4 ug/mL	0.3 ug/mL

\*= reference range for Co-Q10 at our laboratory = 0.3 to 1.5 ug/mL

## References

1. Moore NL, Kiebzak GM: Sub-optimal vitamin D status is a highly prevalent but treatable condition in both hospitalized patients and the general population. *J Am Acad Nurse Pract*, 2007; 19(12): 642-651.
2. Kiebzak GM, Moore NL, Margolis S, et. al: Vitamin D status of patients admitted to a hospital rehabilitation unit; relationship to function and progress. *Am J Phys Med Rehabil*, 2007; 86(6): 435-445.
3. Lappe J, Tavera-Gustafson D, Davis K, et. al: Vitamin D and calcium supplementation reduces cancer risk: results of a randomized trail. *Am J Clin Nutr*, 2007; 85(6): 1586-1591.
4. Grant B: An estimation of premature mortality in the U.S. due to inadequate doses of solar ultraviolet-B radiation. *Cancer*, 2002; 94: 1867-1875.
5. Vieth R, Ladaky Y, Walfish PE: Age related changes in the 25-hydroxy vitamin D versus parathyroid hormone relationship suggest a different reason why older adults require more vitamin D. *J Clin Endocrinol Metab*, 2003; 88(1): 85-91.
6. Ashton FE: Vitamin D supplementation in the fight against multiple sclerosis. *J Orthomol Med*, 2004; 17(1): 27-38.
7. Vieth R, Bischoff-Ferrari H, Borchers BJ, et. al: The urgent need to recommend an intake of vitamin D that is effective. *Am J Clin Nutr*, 2007; 85(3): 649-650.