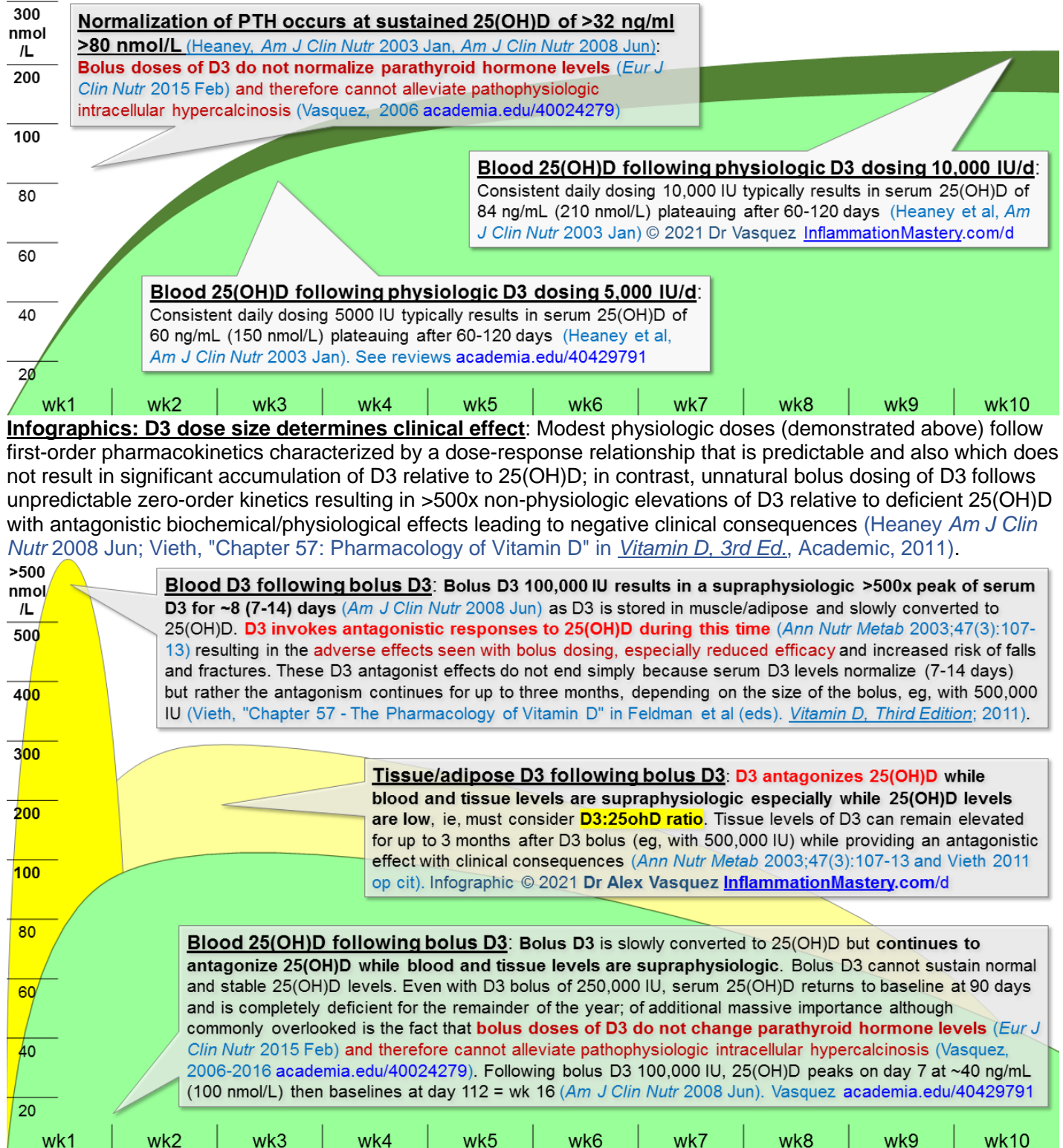
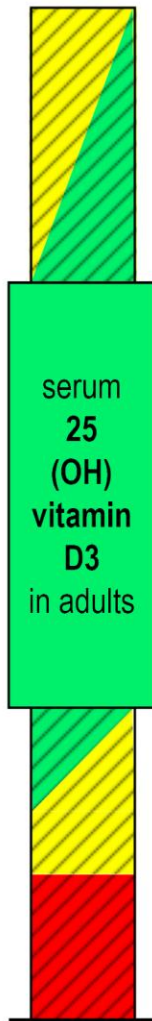


Vitamin D3 Pharmacology Infographic: Physiologic Dosing versus Bolus Roulette

Alex Vasquez D.O., D.C., N.D. (USA), F.A.C.N.





Pharmacologic dosing (eg, cancer, multiple sclerosis): 200–300 ng/mL (500–750 nmol/L)

Requires professional supervision, diet modification, laboratory surveillance per Charoengam and Holick, *Nutrients* 2020 Jul

Potentially toxic if accompanied by clinical hypercalcemia: > 150 ng/mL (325 nmol/L)

per Grant and Holick, *Altern Med Rev* 2005 Jun

Supraphysiologic: > 100 ng/mL (250 nmol/L)

Higher levels of 25-hydroxy-cholecalciferol are clinically problematic if accompanied by hypercalcemia, calcinosis or urolithogenic hypercalciuria (especially with alkaline urine). Levels above 90-100 ng/mL (225-250 nmol/L) are generally supraphysiologic, but not inherently problematic.

Optimal physiologic range: 50-90 ng/mL (125-225 nmol/L)

Clinical example: prevention/treatment of SAS-2 coronavirus per "Participants were randomised to receive daily 60 000 IU of [Vit D3]..."

cholecalciferol supplementation was continued for those with 25(OH)D <50 ng/ml..." per Rastogi et al. *Postgrad Med J* 2020 Nov

Populations in sunny climates (Grant and Holick, *Altern Med Rev* 2005 Jun): pregnant rural Africans 58 ng/mL (147 nmol/L) per Luxwolda, *Eur J Nutr*

2013 Apr; USA or Israel lifeguards 59-65 ng/mL (148-163 nmol/L), farmers in Puerto Rico 90 ng/mL (225 nmol/L) per Vieth, *Am J Clin Nutr* 1999 May

Review: Clinical importance of vitamin D: paradigm shift with implications for all healthcare providers. *Altern Therap Health Med* 2004 Sep

Context: Supplemented Paleo-Mediterranean Diet. *Nutritional Perspectives* 2011 Jan academia.edu/39751813

Copyright © 2020 Dr Alex Vasquez. See videos, article compilation. InflammationMastery.com/d

Sufficiency (more health, less depression): 40-50 ng/mL (100-125 nmol/L)

Clinical example: enhanced well-being at 40g/ml, reduced use of antidepressant drugs per Bergman et al, *BMC Res Notes* 2015 Sep

Populations: nonpregnant rural Africans 46 ng/mL (115 nmol/L) per Luxwolda et al, *Eur J Nutr* 2013 Apr

Marginal sufficiency, increased mortality: < 30-40 ng/mL (75-100 nmol/L)

Garland et al, *Am J Public Health* 2014 Aug

Insufficiency (increased PTH, respiratory infections, ARDS): < 32 ng/mL (80 nmol/L)

Requires 114 mcg/d (4600 IU/d), per Heaney et al, *Am J Clin Nutr* 2003 Jan

Depletion (osteomalacia, chronic pain, weakness, infections): < 20 ng/mL (50 nmol/L)

Persistent, nonspecific musculoskeletal pain per Plotnikoff and Quigley, *Mayo Clin Proc* 2003 Dec

Infographic: Interpretation of serum 25-hydroxy-cholecalciferol levels in adults: Interpretation of any laboratory variable requires clinical contextualization; assessing renal function and measuring 1,25-dihydroxy-cholecalciferol prior to the initiation of vitamin D3 supplementation is reasonable, especially in patients with higher probability of renal insufficiency or granulomatous/malignant disease, respectively. Coadministration of calcium-sparing drugs (e.g., thiazides) warrants caution; periodic measurement of serum calcium is advised, especially during the first year of higher-dose vitamin D supplementation. Supplementation with cholecalciferol should generally be accompanied by adequate magnesium intake and/or supplementation with magnesium 600 mg/d for adults; vitamins K1 and K2 should also be utilized to optimize calcium metabolism. Dietary optimization, moderation of sodium intake, broad-spectrum nutritional supplementation, and avoidance of diet-induced metabolic acidosis are likewise important; see citations listed below for proper implementation. Treatment should be supervised by a nutrition-knowledgeable clinician.

Infographic citations included in images; see also:

1. Vasquez et al. [Clinical importance of vitamin D: a paradigm shift for all healthcare providers.](#) *Altern Ther Health Med* 2004 Sep
2. Vasquez A. [Textbook of Clinical Nutrition and Functional Medicine.](#) ICHNFM.ORG, 2016
3. Vasquez A. How to Plan Studies Using Vitamin D. *Int J Hum Nutr Funct Med* 2017 academia.edu/31412957
4. Vasquez A. Revisiting the Supplemented Paleo-Mediterranean Diet. *Nutr Perspect* 2011 Jan academia.edu/39751813
5. Videos/excerpts 2020, articles and correspondence compilation 2004-2019. InflammationMastery.com/d
6. Heaney et al. Human serum 25-hydroxycholecalciferol response to extended oral dosing with cholecalciferol. *Am J Clin Nutr.* 2003 Jan;77(1):204-10. doi: 10.1093/ajcn/77.1.204
7. Heaney et al. 25-Hydroxylation of vitamin D3: relation to circulating vitamin D3 under various input conditions. *Am J Clin Nutr.* 2008 Jun;87(6):1738-42. doi: 10.1093/ajcn/87.6.1738

About the author and presenter: Alex Kennerly Vasquez DO ND DC (USA), Fellow of the American College of Nutrition (FACN), Overseas Fellow of the Royal Society of Medicine: An award-winning clinician-scholar and founding Program Director of the world's first fully-accredited university-based graduate program in Human Nutrition and Functional Medicine, Dr Alex Vasquez is recognized internationally for his high intellectual and academic standards and for his expertise spanning and interconnecting many topics in medicine and nutrition. Dr Vasquez holds three doctoral degrees as a graduate of University of Western States (Doctor of Chiropractic, 1996), Bastyr University (Doctor of Naturopathic Medicine, 1999), and University of North Texas Health Science Center, Texas College of Osteopathic Medicine (Doctor of Osteopathic Medicine, 2010). Dr Vasquez has completed hundreds of hours of post-graduate and continuing education in subjects including Obstetrics, Pediatrics, Basic and Advanced Disaster Life Support, Nutrition and Functional Medicine; while in the final year of medical school, Dr Vasquez completed a Pre-Doctoral Research Fellowship in Complementary and Alternative Medicine Research hosted by the US National Institutes of Health (NIH). Dr Vasquez is the author of many textbooks, including Integrative Orthopedics (2004, 2007 2012), Functional Medicine Rheumatology (Third Edition, 2014), Musculoskeletal Pain: Expanded Clinical Strategies (commissioned and published by Institute for Functional Medicine, 2008), Chiropractic and Naturopathic Mastery of Common Clinical Disorders (2009), Integrative Medicine and Functional Medicine for Chronic Hypertension (2011), Brain Inflammation in Migraine and Fibromyalgia (2016), Mitochondrial Nutrition and Endoplasmic Reticulum Stress in Primary Care, 2nd Edition (2014), Antiviral Strategies and Immune Nutrition (2014), Mastering mTOR (2015), Autism, Dysbiosis, and the Gut-Brain Axis (2017) and the 1200-page Inflammation Mastery 4th Edition (2016) also published as the two-volume set Textbook of Clinical Nutrition and Functional Medicine. "DrV" has also written approximately 100 letters and articles for professional magazines and medical journals such as *TheLancet.com*, *British Medical Journal* (BMJ), *Annals of Pharmacotherapy*, *Nutritional Perspectives*, *Journal of Manipulative and Physiological Therapeutics* (JMPT), *Journal of the American Medical Association* (JAMA), *Original Internist*, *Integrative Medicine*, *Holistic Primary Care*, *Alternative Therapies in Health and Medicine*, *Journal of the American Osteopathic Association* (JAOA), *Dynamic Chiropractic*, *Journal of Clinical Endocrinology and Metabolism*, *Current Asthma and Allergy Reports*, *Complementary Therapies in Clinical Practice*, *Nature Reviews Rheumatology*, *Annals of the New York Academy of Sciences*, and *Arthritis & Rheumatism*, the Official Journal of the American College of Rheumatology. Dr Vasquez lectures internationally to healthcare professionals and has a consulting practice and service for doctors and patients. DrV has served as a consultant, product designer, writer and lecturer for Biotics Research Corporation since 2004. Having served on the Review Boards for *Journal of Pain Research*, *Autoimmune Diseases*, *PLOS One*, *Alternative Therapies in Health and Medicine*, *Neuropeptides*, *International Journal of Clinical Medicine*, *Journal of Inflammation Research*, *BMC Complementary and Alternative Medicine* (all PubMed/Medline indexed), and *Journal of Naturopathic Medicine* and as the founding Editor of *Naturopathy Digest*, Dr Vasquez is currently the Editor (2013-) of International Journal of Human Nutrition and Functional Medicine and Former Editor (2018-2019) of *Journal of Orthomolecular Medicine*, published for more than 50 consecutive years by the International Society for Orthomolecular Medicine.

INFLAMMATION MASTERY

4TH EDITION

CLINICAL NUTRITION, FUNCTIONAL MEDICINE, MITOCHONDRIAL DYSFUNCTION, MICROBIOME & DYSBIOSIS, FUNCTIONAL INFLAMMOLOGY, PAIN MANAGEMENT, INTEGRATIVE RHEUMATOLOGY, NUTRITIONAL IMMUNOMODULATION, IMMUNONUTRITION & ANTIVIRAL STRATEGIES

The Colorful and Definitive Guide Toward Health and Vitality
and away from the Boredom, Risks, Costs, and Inefficacy of
Endless Analgesia, Immunosuppression, and Polypharmacy

3-Part Learning System of Text, Illustrations, and Video

DR. ALEX VASQUEZ
ICHNFM.ORG

INTERNATIONAL COLLEGE OF HUMAN NUTRITION AND FUNCTIONAL MEDICINE