Vitamina D: quando e come utilizzare il calcifediolo

Stefano Gonnelli

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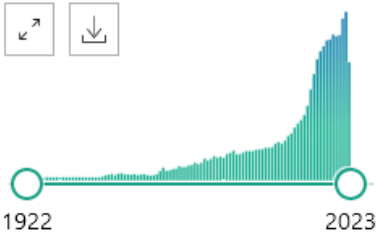
RESULTS BY YEAR



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- Full text

ARTICLE ATTRIBUTE

- Associated data

ARTICLE TYPE

- Books and Documents

1 Cite Share

Recommendations For Physical Medicine and Rehabilitation to Improve Systemic Lupus Erythematosus Related Sarcopenia - A Literature Review.

Defi IR, Profita JC, Arisanti F, Charismawati S.

Curr Rheumatol Rev. 2022 Sep 28. doi: 10.2174/1573397118666220928140707. Online ahead of print.

PMID: 36173056

Nutritional interventions such as protein, amino acids, essential fatty acids, and **vitamin D** produce biological effects that will enhance the physiological adaptation of exercise. ...

2 Cite Share

Vitamin D Deficiency and Depression in Thai Medical Students During COVID-19 Pandemic: a Cross-Sectional Study.

Anuroj K.

East Asian Arch Psychiatry. 2022 Sep;32(3):51-56. doi: 10.12809/eaap2209.

PMID: 36172722

METHODS: Medical students of year 4 and year 5 rotating in the Srinakharinwirot University Hospital who had no diseases associated with **vitamin D** deficiency and had not taken **vitamin D** supplement in the past year were invited to participate. ...**Vita** ...

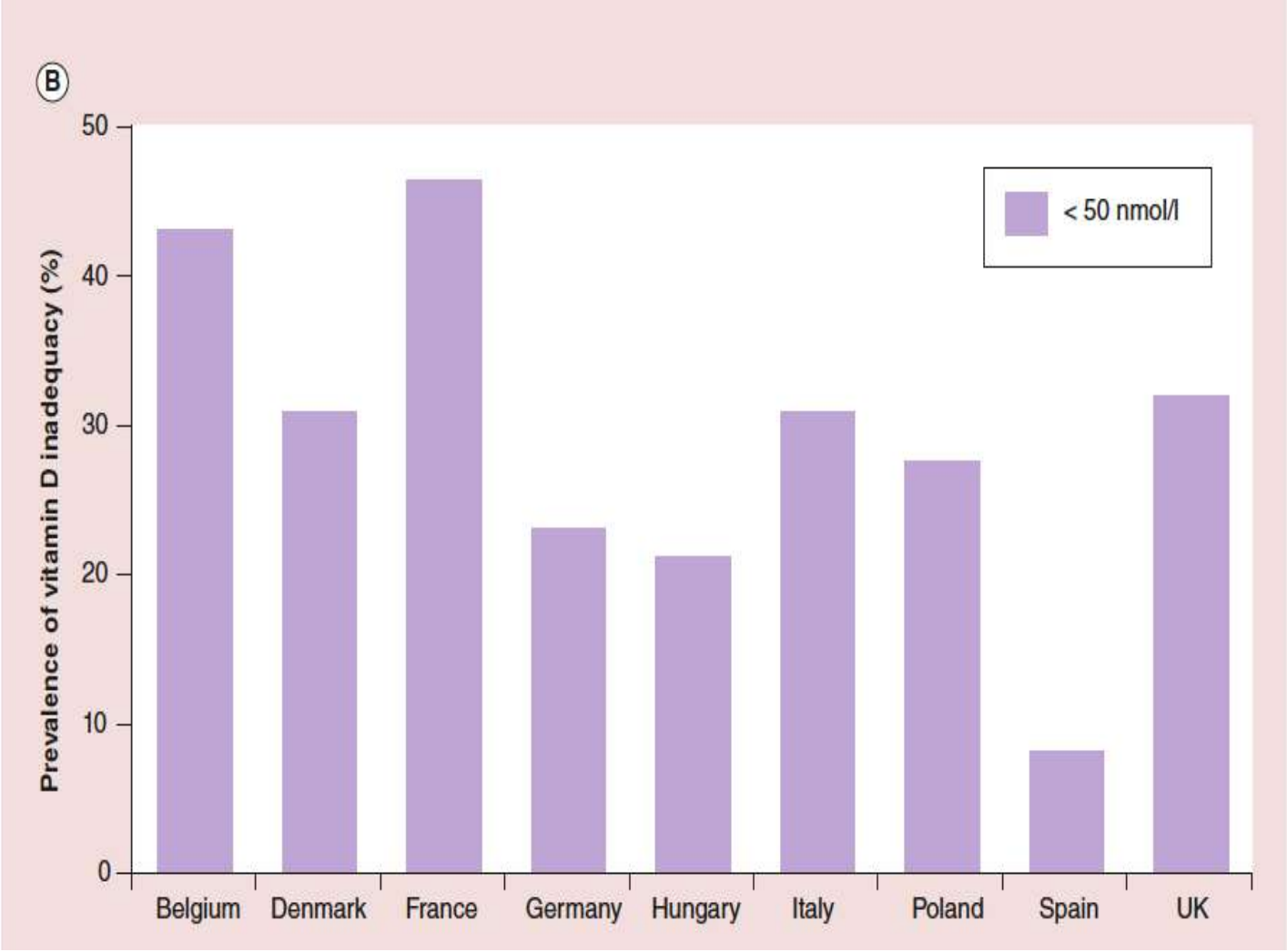
3 Cite

Could **vitamin D** supplementation play a role against COVID-19?

Li B, Yang S, Hou N.

Front Immunol. 2022 Sep 12;13:967215. doi: 10.3389/fimmu.2022.967215. eCollection 2022.

Prevalence vitamin D inadequacy



Rizzoli R. et al 2014,

nutrients 2022

MDPI

Review

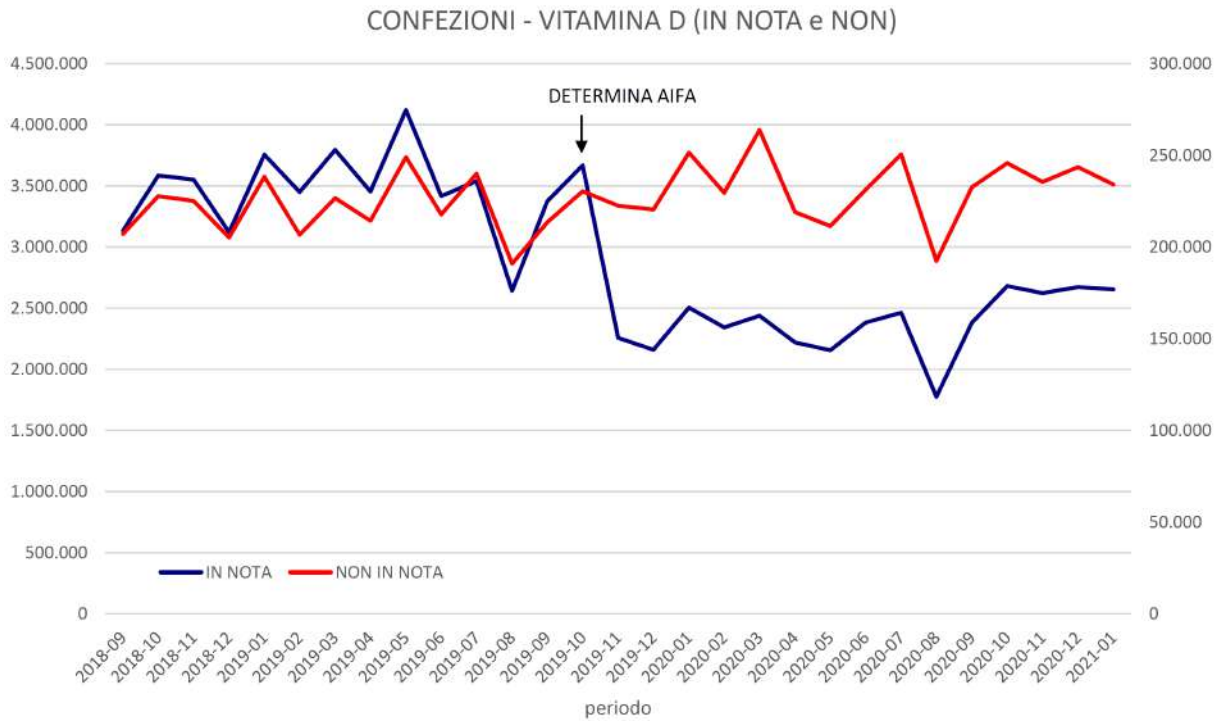
Definition, Assessment, and Management of Vitamin D Inadequacy: Suggestions, Recommendations, and Warnings from the Italian Society for Osteoporosis, Mineral Metabolism and Bone Diseases (SIOMMMS)

Francesco Bertoldo [1], Luisella Cianferotti [2], Marco Di Monaco [3], Alberto Falchetti [4,*], Angelo Fassio [5], Davide Gatti [5], Luigi Gennari [6], Sandro Giannini [7], Giuseppe Girasole [8], Stefano Gonnelli [6], Nazzarena Malavolta [9], Salvatore Minisola [10], Mario Pedrazzoni [11], Domenico Rendina [12], Maurizio Rossini [5] and Iacopo Chiodini [13,14]

	Deficiency *	Insufficiency *	Optimal * Optimum *
GENERAL POPULATION	<10 ng/mL	<20 ng/mL	**20–50 ng/mL**
POPULATION AT RISK ** OR ON TREATMENT WITH *BONE MODIFYING AGENTS*	<10 ng/mL	<30 ng/mL	**30–50 ng/mL**

AGENZIA ITALIANA DEL FARMACO
Tutela Ricerca e Sviluppo per la Salute

NOTA 96 – Monitoraggio andamento dei consumi della nota relativa alla vitamina D e analoghi



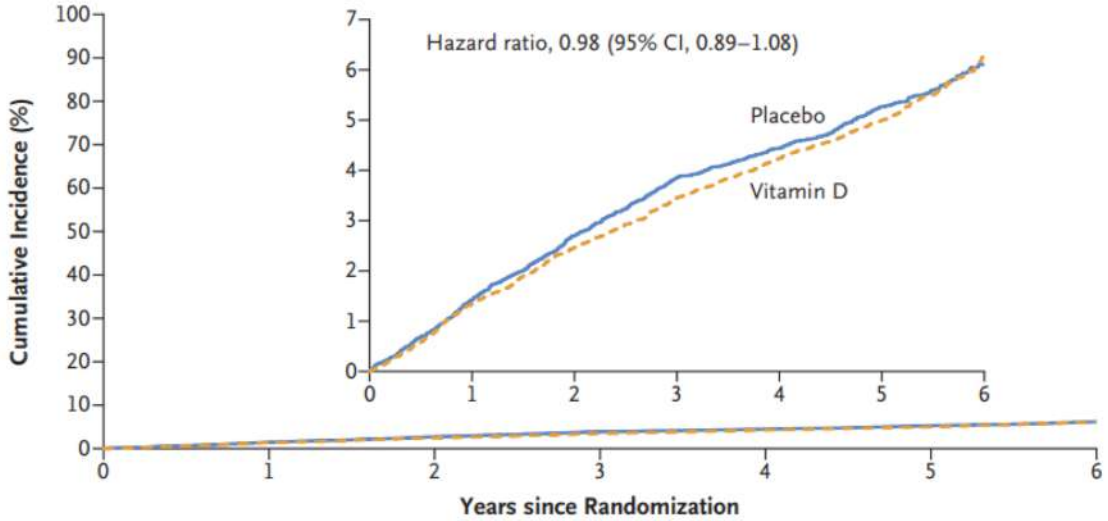
The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JULY 28, 2022 VOL. 387 NO. 4

Supplemental Vitamin D and Incident Fractures in Midlife and Older Adults

Meryl S. LeBoff, M.D., Sharon H. Chou, M.D., Kristin A. Ratliff, B.A., Nancy R. Cook, Sc.D., Bharti Khurana, M.D.,

Total Fractures



No. at Risk

Placebo	12,927	12,737	12,578	12,438	12,218	9830	793
Vitamin D	12,944	12,742	12,561	12,399	12,188	9785	782

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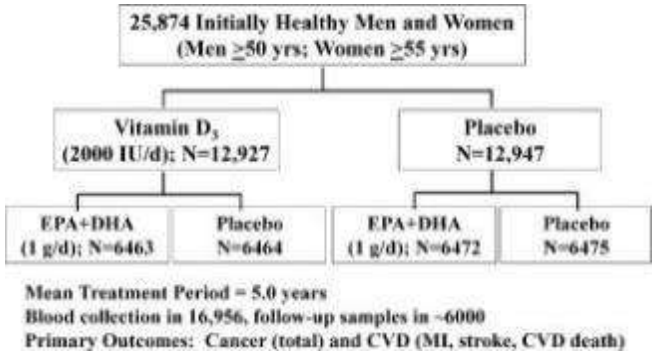
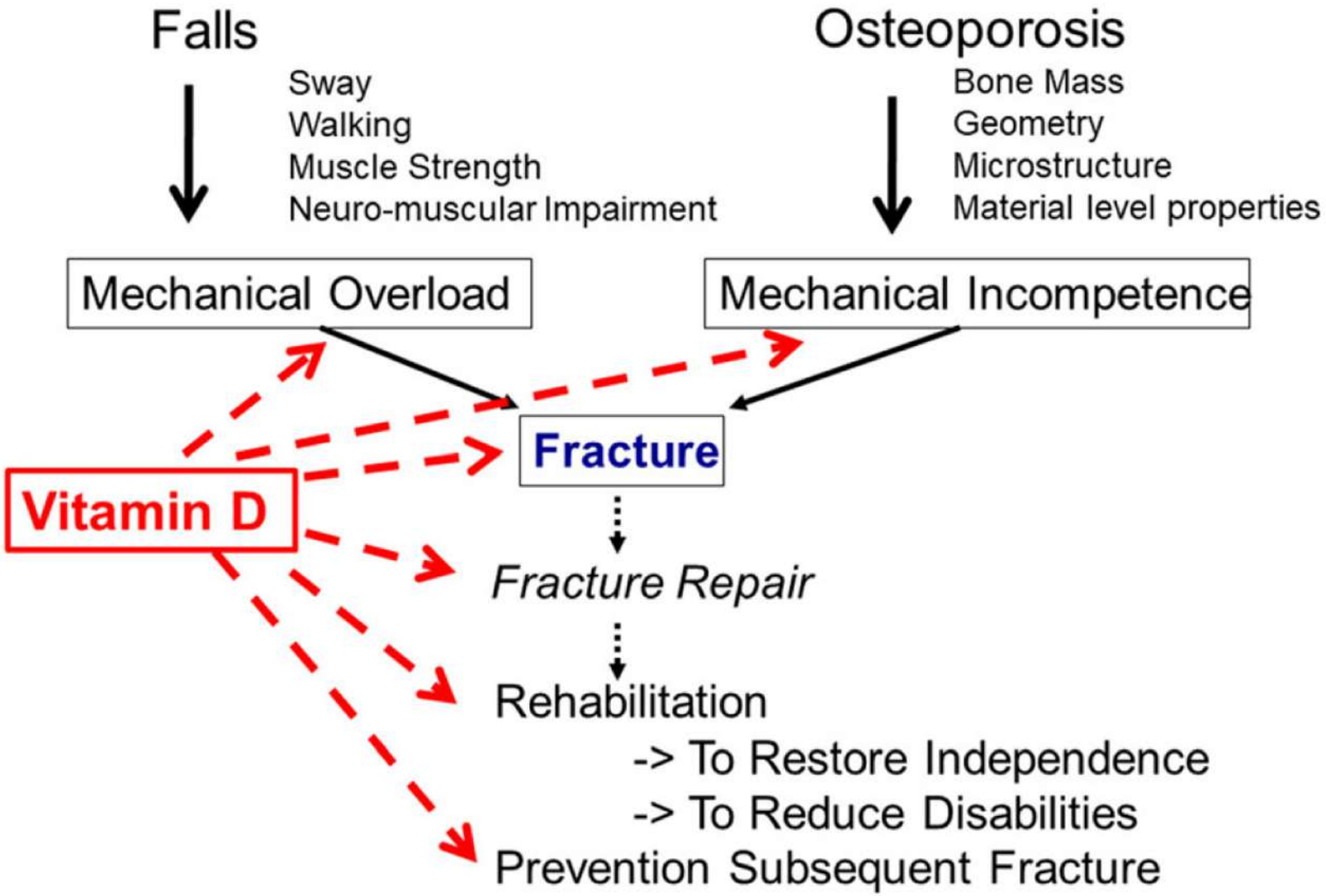


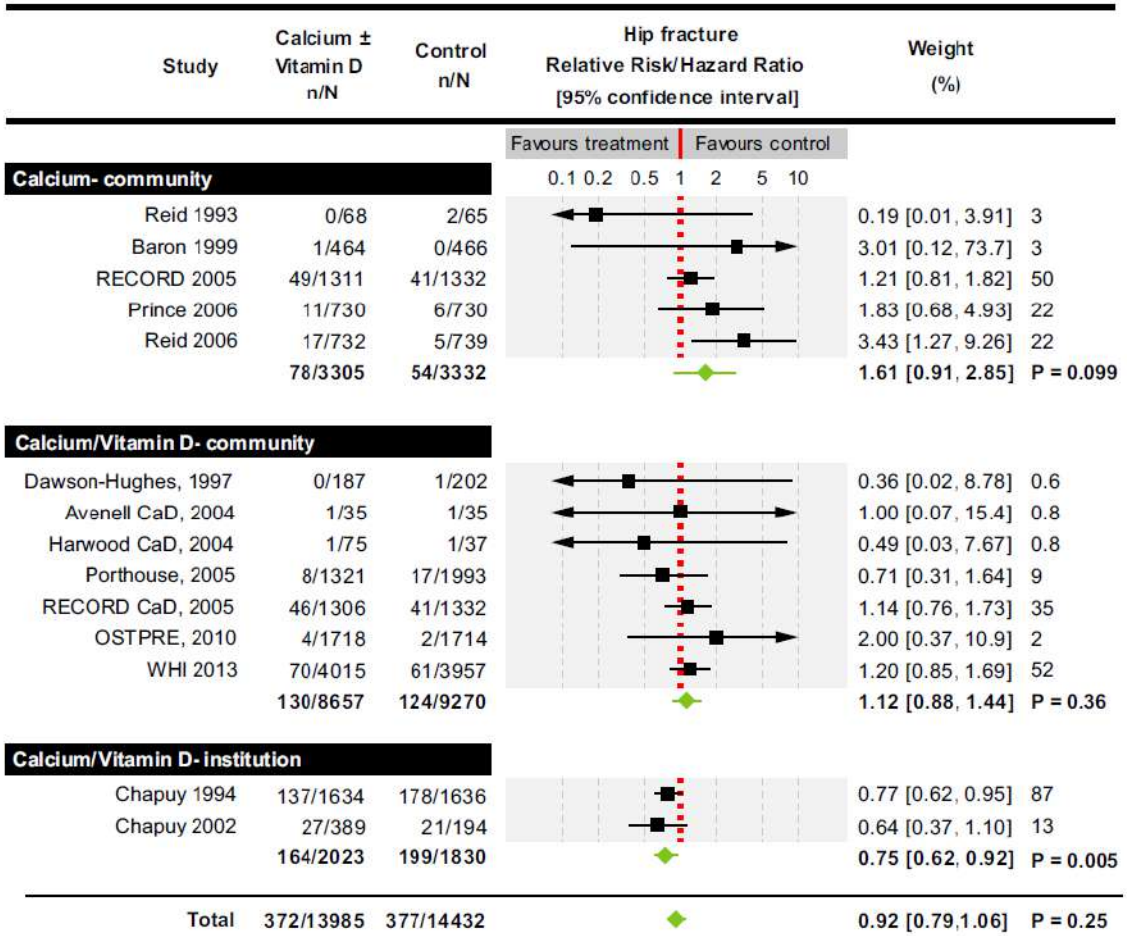
Characteristic	Total (N=25,871)	Vitamin D Group (N=12,927)	Placebo Group (N=12,944)
Female sex — no. (%)	13,085 (50.6)	6,547 (50.6)	6,538 (50.5)
Age — yr	67.1±7.1	67.1±7.0	67.1±7.1
Baseline 25-hydroxyvitamin D level — ng/ml	30.7±10.0	30.7±10.0	30.7±10.0
Baseline calcium level — mg/dl**	9.00±1.61	9.00±1.61	9.00±1.61

Role of vitamin D in the pathogenesis and management of osteoporotic fractures



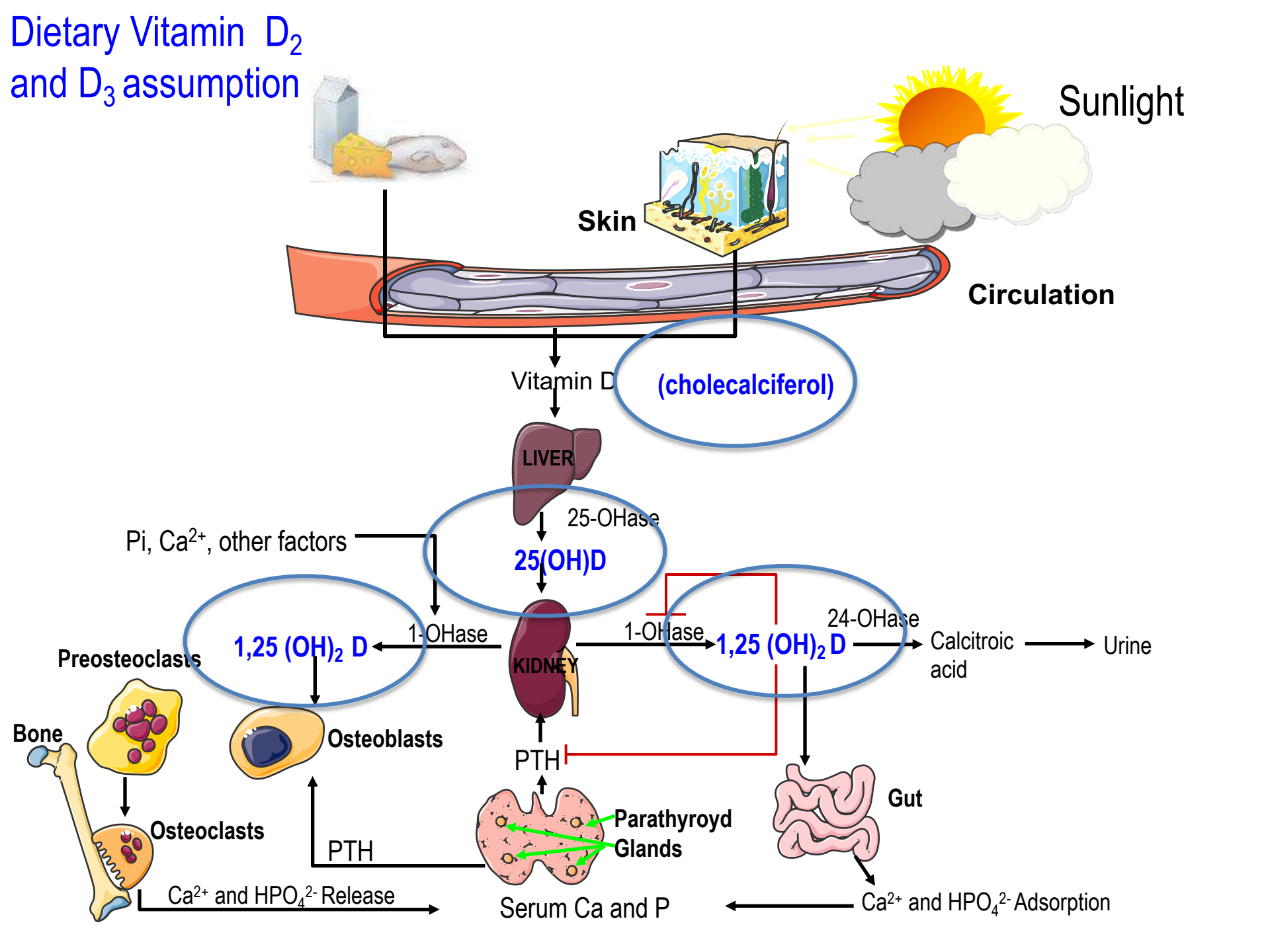
Chevalley T et al Osteoporos Int 2021

The effects of calcium alone or with vitamin D on hip fracture risk

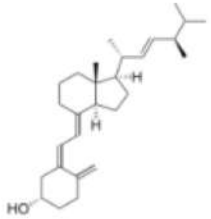
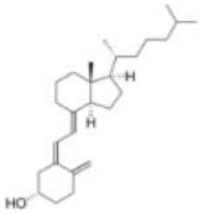
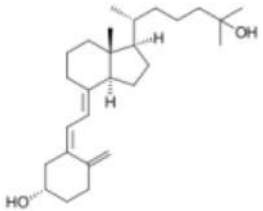
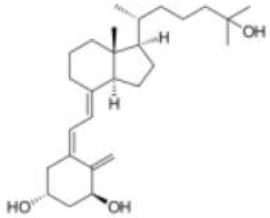


Reid IR et al. J Intern Med 2015

Dietary Vitamin D_2 and D_3 assumption

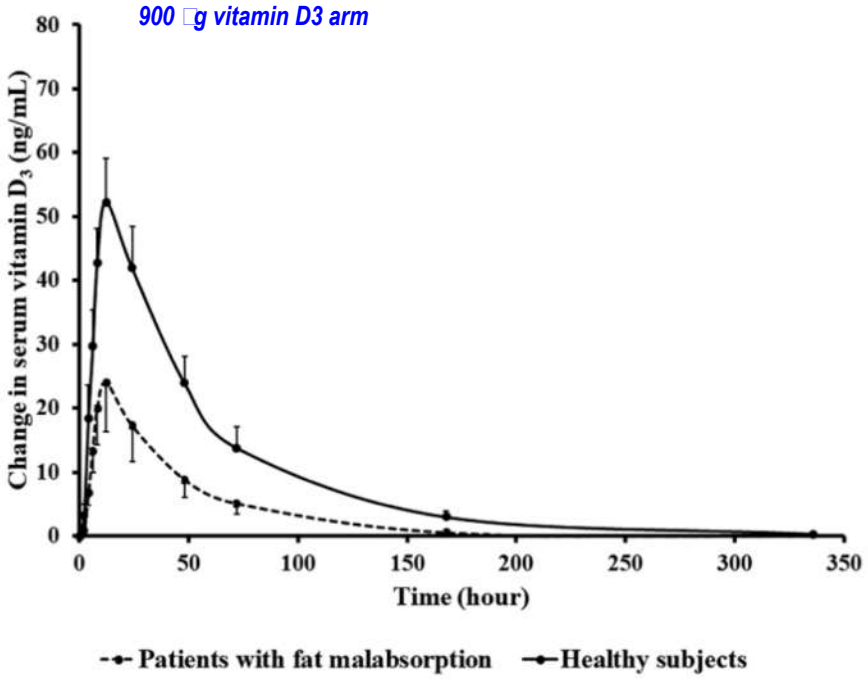


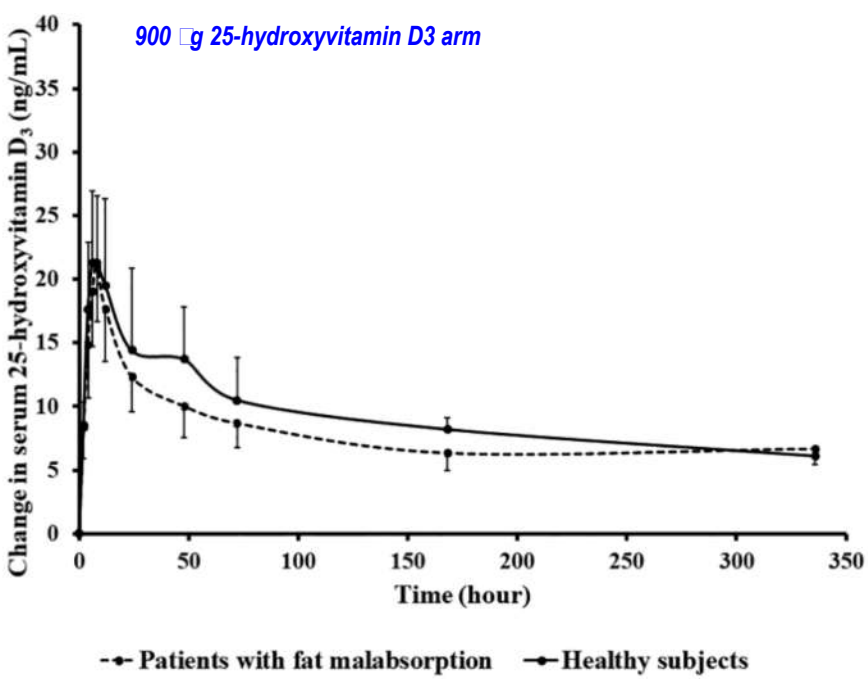
Characteristics of vitamin D compounds and activated forms

	Ergocalciferol	Cholecalciferol	Calcifediol (or Calcidiol)	Calcitriol
Chemical Structure				
Absorption	Intestine (bile required)	Intestine (bile required)	Intestine, readily absorbed *	Intestine, readily absorbed *
DBP dissociation constant	10^{-7}	10^{-7}	10^{-9}	10^{-7}
Volume of distribution	very limited in plasma compartment; rapidly stored in fat tissue	very limited in plasma compartment; rapidly stored in fat tissue	larger than plasma volume	plasma compartment
Tissue distribution for long-term	adipose tissue, muscle	adipose tissue, muscle	blood, adipose tissue, muscle	blood and tissues
Circulating half-life	2 days	2 days	3 weeks	4–8 h
Functional half-life	2–3 months	≤2 months	2–3 months	4–8 h

Dominguez LJ et al. Metabolites 2021

Changes in serum levels of vitamin D3 and calcifediol



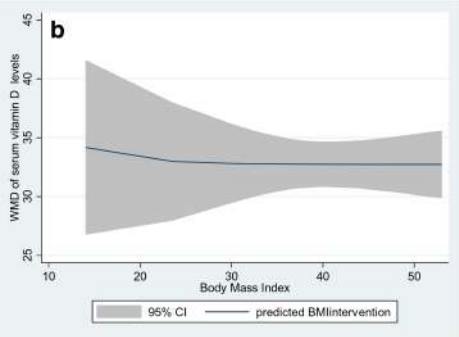


Charoenngam N et al. Am J Clin Nutr 2021

Reviews in Endocrine and Metabolic Disorders (2020) 21:67–76
https://doi.org/10.1007/s11154-019-09527-7

Obesity and overweight decreases the effect of vitamin D supplementation in adults: systematic review and meta-analysis of randomized controlled trials

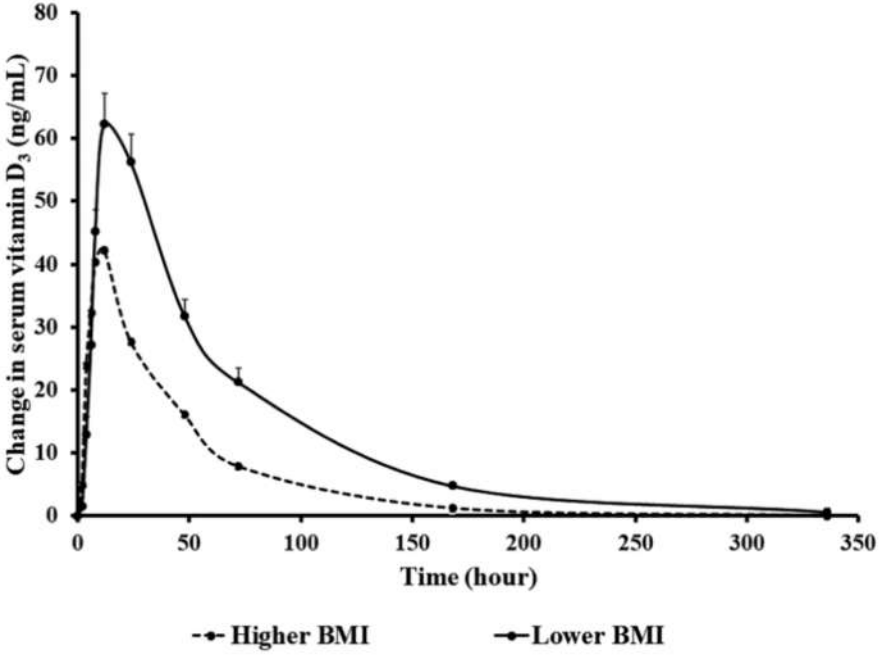
Lara Fonseca de Oliveira [1] · Lucas Guimarães de Azevedo [1] · Jerusa da Mota Santana [2] · Luanna Pimenta Carlos de Sales [1] · Marcos Pereira-Santos [3]

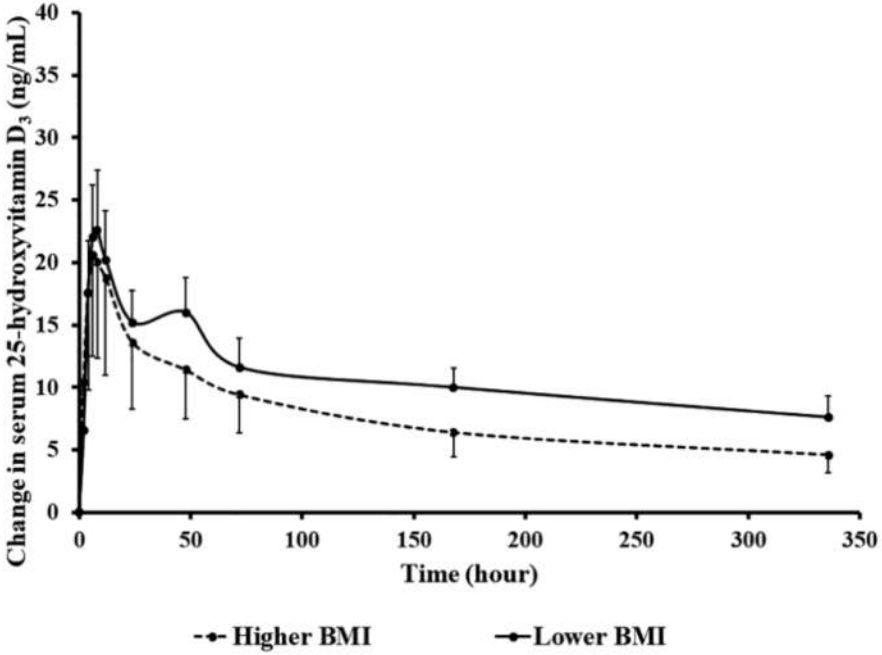


- Aumento della prevalenza dell'ipovitaminosi D all'aumentare del BMI in quanto vitamina liposolubile verrebbe sequestrata nel tessuto adiposo

- Riduzione della concentrazione della 25(OH) vitamina D pari all' 1.15% per ogni aumento del BMI di 1 Kg/m2.

Changes in serum levels of vitamin D3 and calcifediol on the basis of BMI



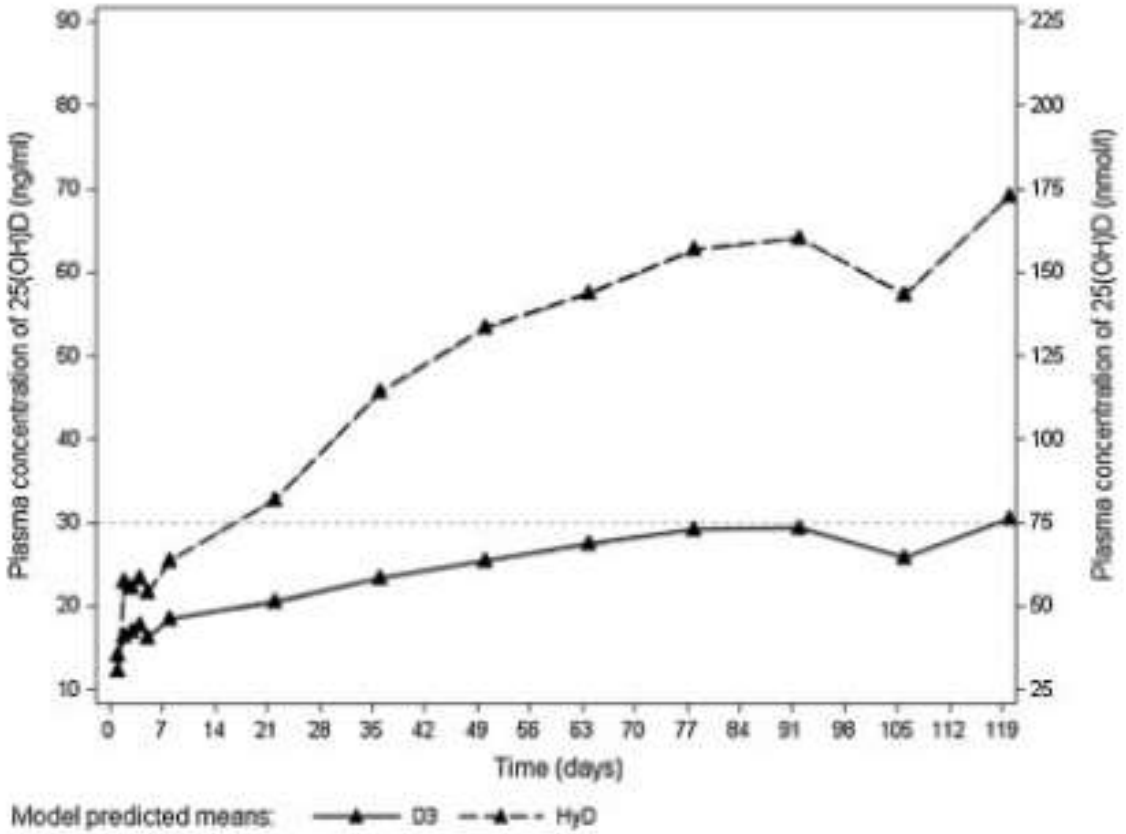


Charoenngam N et al. Am J Clin Nutr 2021

Peculiar characteristics of calcifediol with respect to cholecalciferol

- Better intestinal absorption (via vena porta)
- Less trapping by adipose tissue
- Lower volume of distribution
- Shorter half-life
- Better ability to bind to the muscle VDR (?)

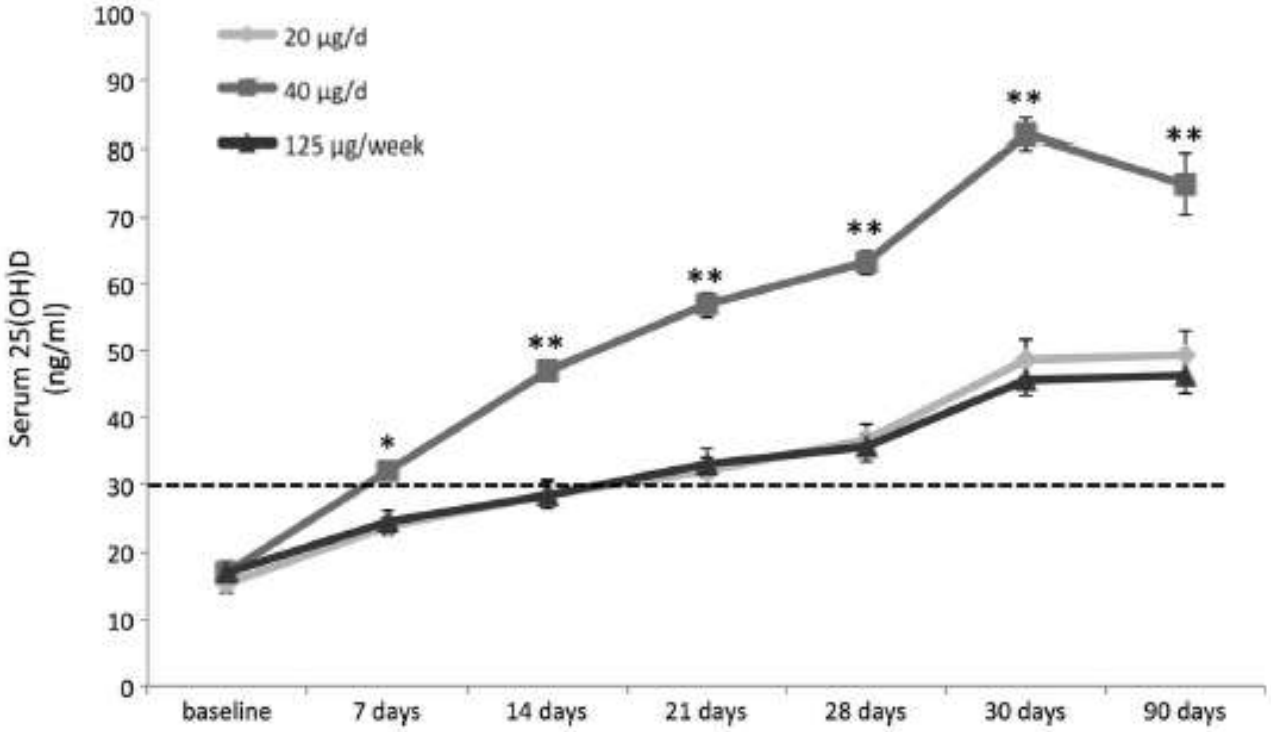
Change in 25(OH)D over time with Calcidiol (HyD, 20 mcg) versus vitamin D3



Oral Supplementation with 25(OH)D3 versus Vitamin D3: Effects on 25(OH)D Levels

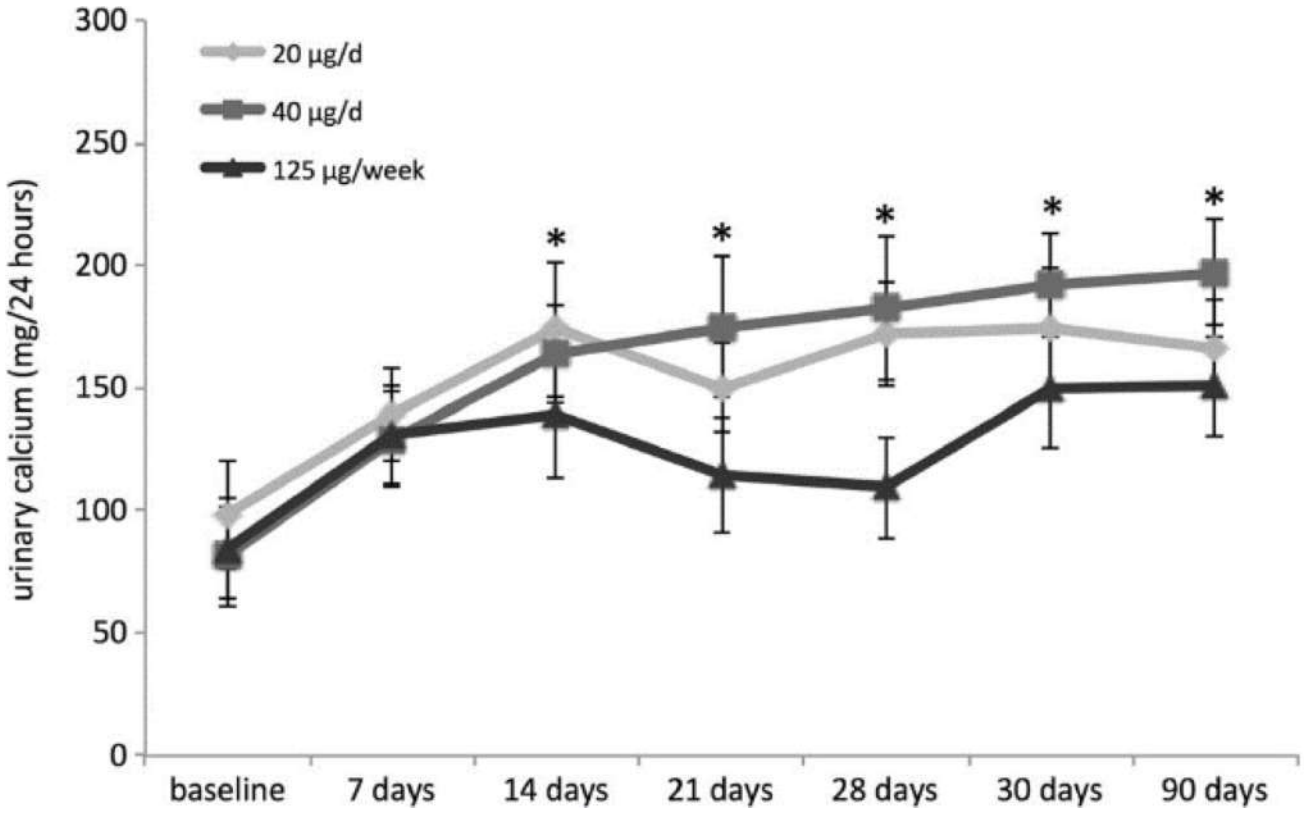
Bishoff-Ferrari H. et al 2012

Time profile of the response of serum 25(OH)D (ng/ml) to different dose regimens of calcidiol at various time points



Minisola S. et al 2017

Time profile of urinary calcium (mg/24 h) under different dose regimens of calcidiol at various time points



Minisola S. et al 2017

STUDIO SULLA FARMACOCINETICA DEL CALCIFEDIOLO (25OHD3) IN DONNE AFFETTE DA OSTEOPOROSI POSTMENOPAUSALE

- Studio monocentrico di farmacocinetica, in aperto, di fase IV, randomizzato con un rapporto 1:1, a gruppi paralleli, su pazienti di sesso femminile affette da osteoporosi postmenopausale con livelli di 25OHD tra 10 e 20 ng/ml

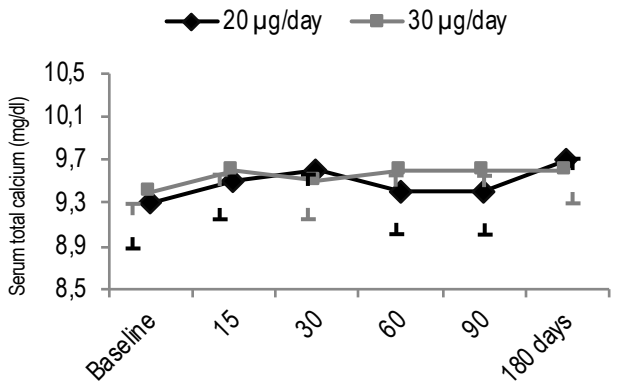
- Un *braccio **A*** (25 donne):
  28 gtt a settimana (pari a 140 mcg) di calcifediolo per sei mesi (=4 gtt die)

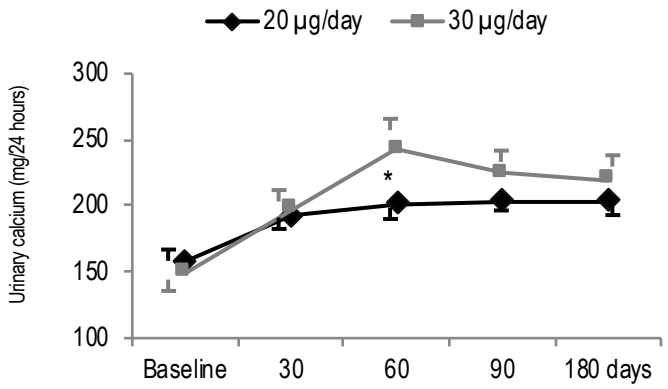
- Un *braccio **B*** (25 donne):
  42 gtt a settimana (pari a 210 mcg) di calcifediolo per sei mesi (=6 gtt die)

Aging Clinical and Experimental Research
https://doi.org/10.1007/s40520-020-01779-7

ORIGINAL ARTICLE

Pharmacokinetic profile and effect on bone markers and muscle strength of two daily dosage regimens of calcifediol in osteopenic/ osteoporotic postmenopausal women

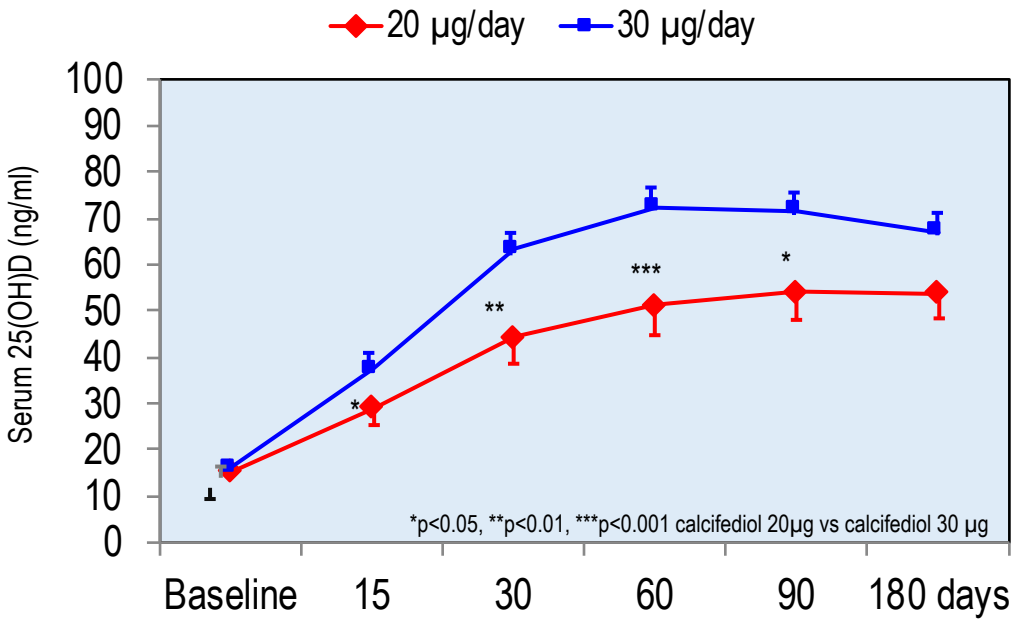




*p<0.05 calcifediol 20µg vs calcifediol 30 µg

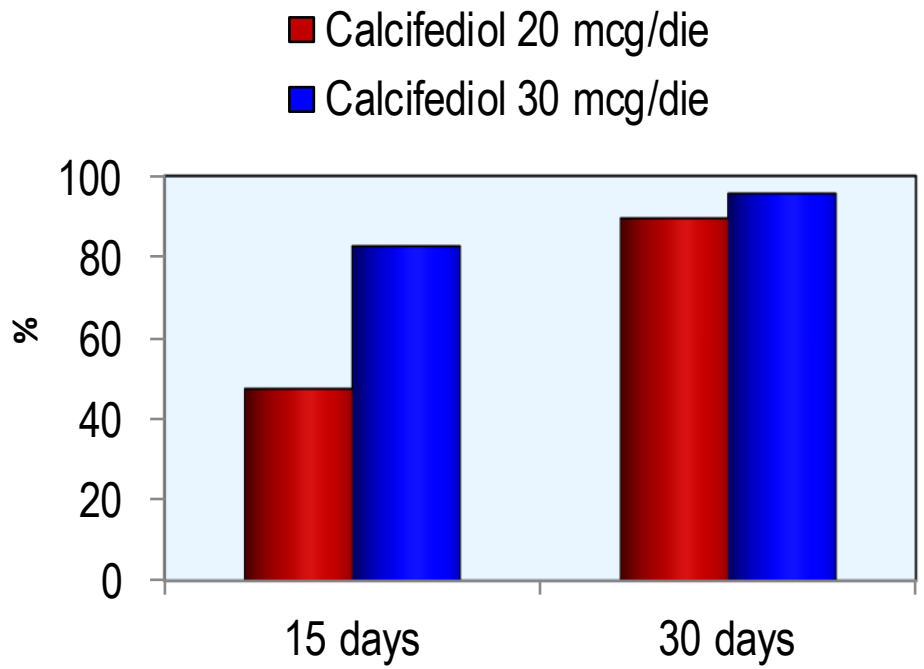
Gonnelli S et al. Aging Clin Exp Res. 2021

Mean values of 25(OH)D serum levels over time in participants grouped by different dose regiments of calcifediol



Gonnelli S et al. Aging Clin Exp Res. 2021

Values of 25OHD > 30ng/ml after 15 and 30 days in patients treated with 20 mcg/die and 30 mcg/die of calcifediol



Gonnelli S et al. Aging Clin Exp Res. 2021

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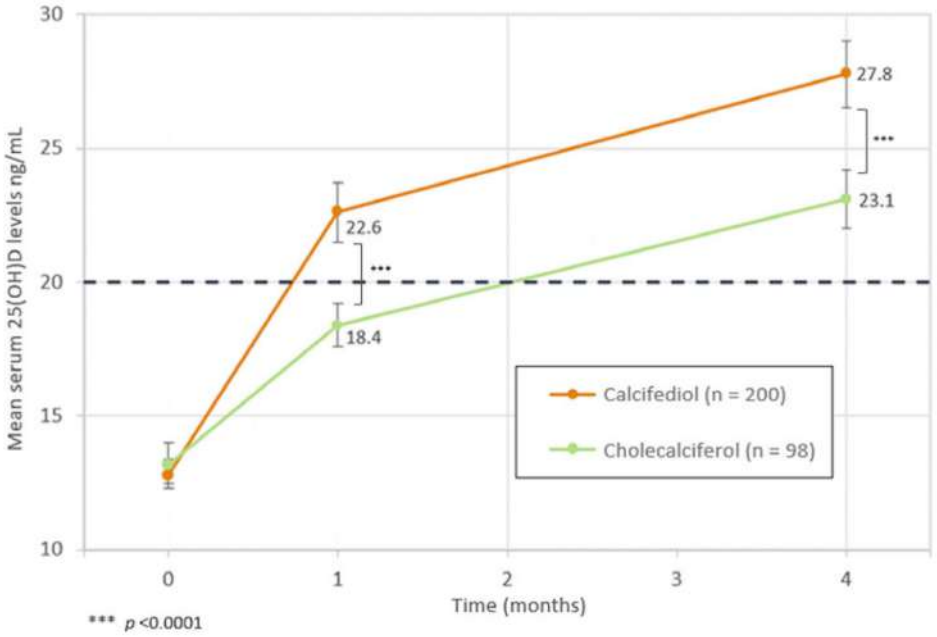
Calcifediol is superior to cholecalciferol in improving vitamin D status in postmenopausal women: a randomized trial



Pérez-Castrillon JL et al. J Bone Miner Res 2021

CLINICAL TRIAL

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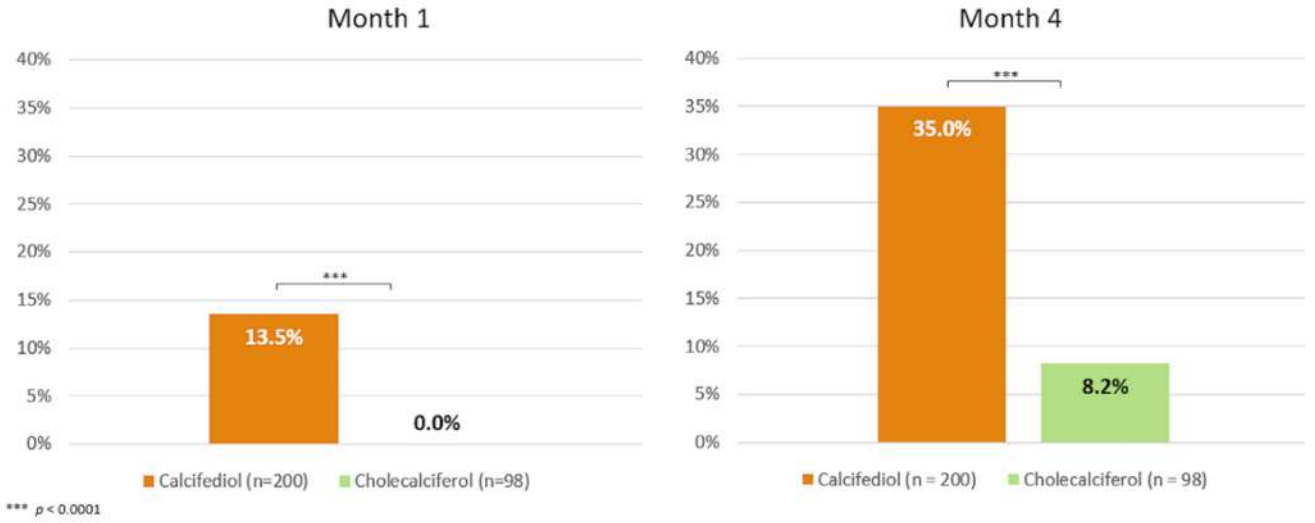
Calcifediol is superior to cholecalciferol in improving vitamin D status in postmenopausal women: a randomized trial



Pérez-Castrillon JL et al. J Bone Miner Res 2021

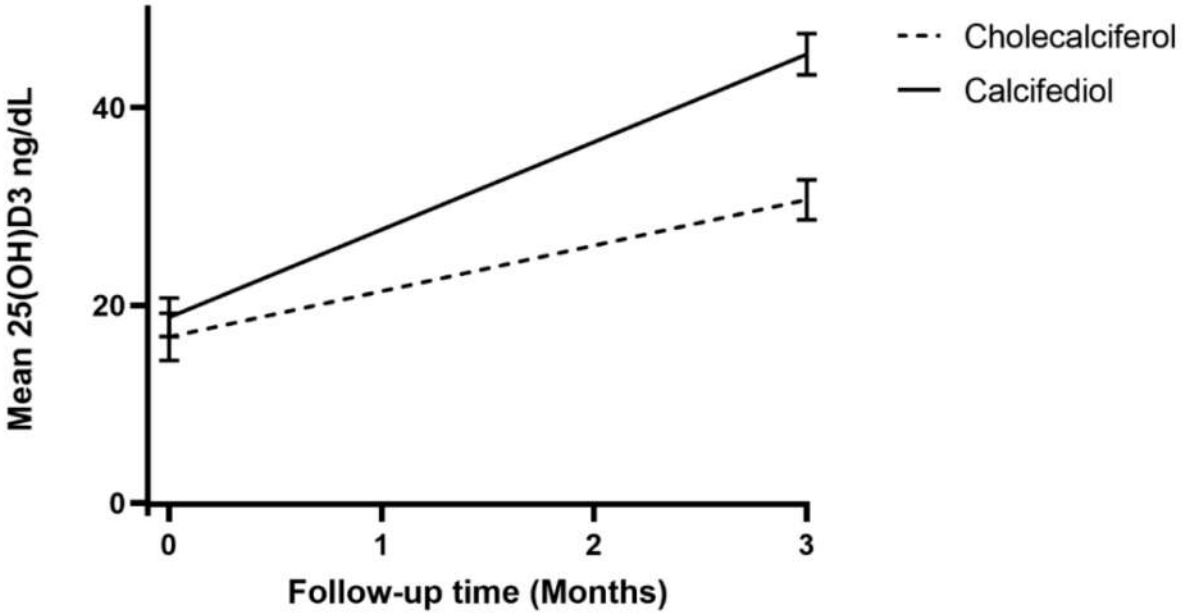
geriatrics 2022

MDPI

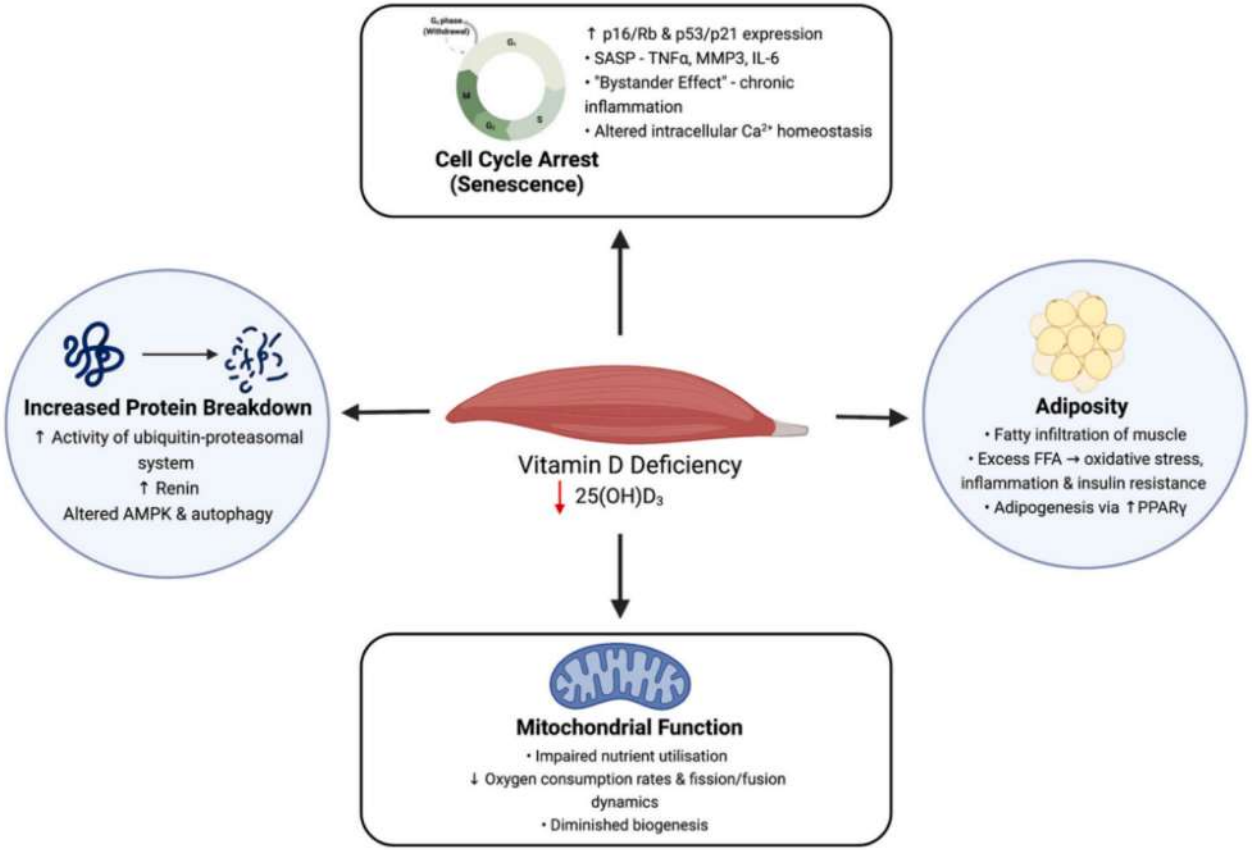
Article

A Randomized, Open-Label Study to Assess Efficacy of Weekly Assumption of Cholecalciferol versus Calcifediol in Older Patients with Hypovitaminosis D

Chukwuma Okoye, Valeria Calsolaro, Filippo Niccolai, Alessia Maria Calabrese, Riccardo Franchi, Sara Rogani, Giulia Coppini, Virginia Morelli, Nadia Caraccio and Fabio Monzani *



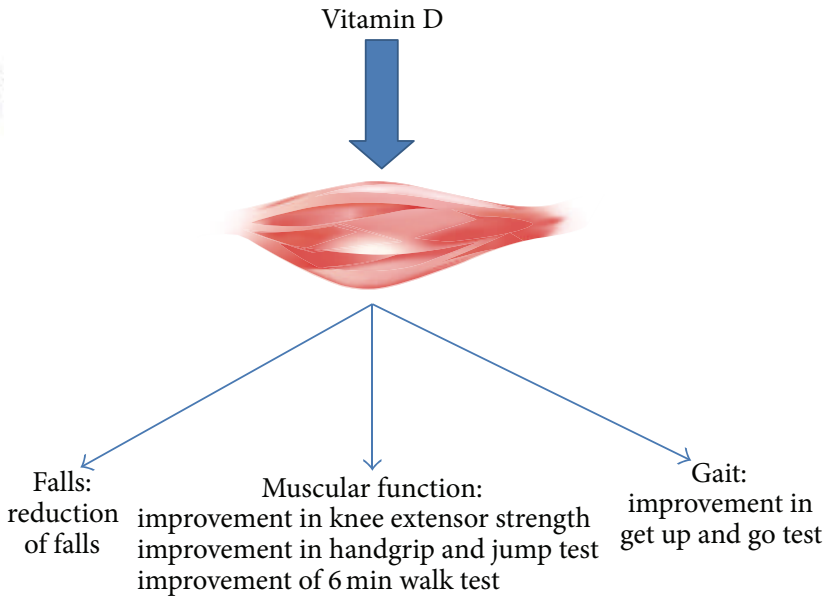
The proposed mechanisms of vitamin D deficiency in skeletal muscle atrophy



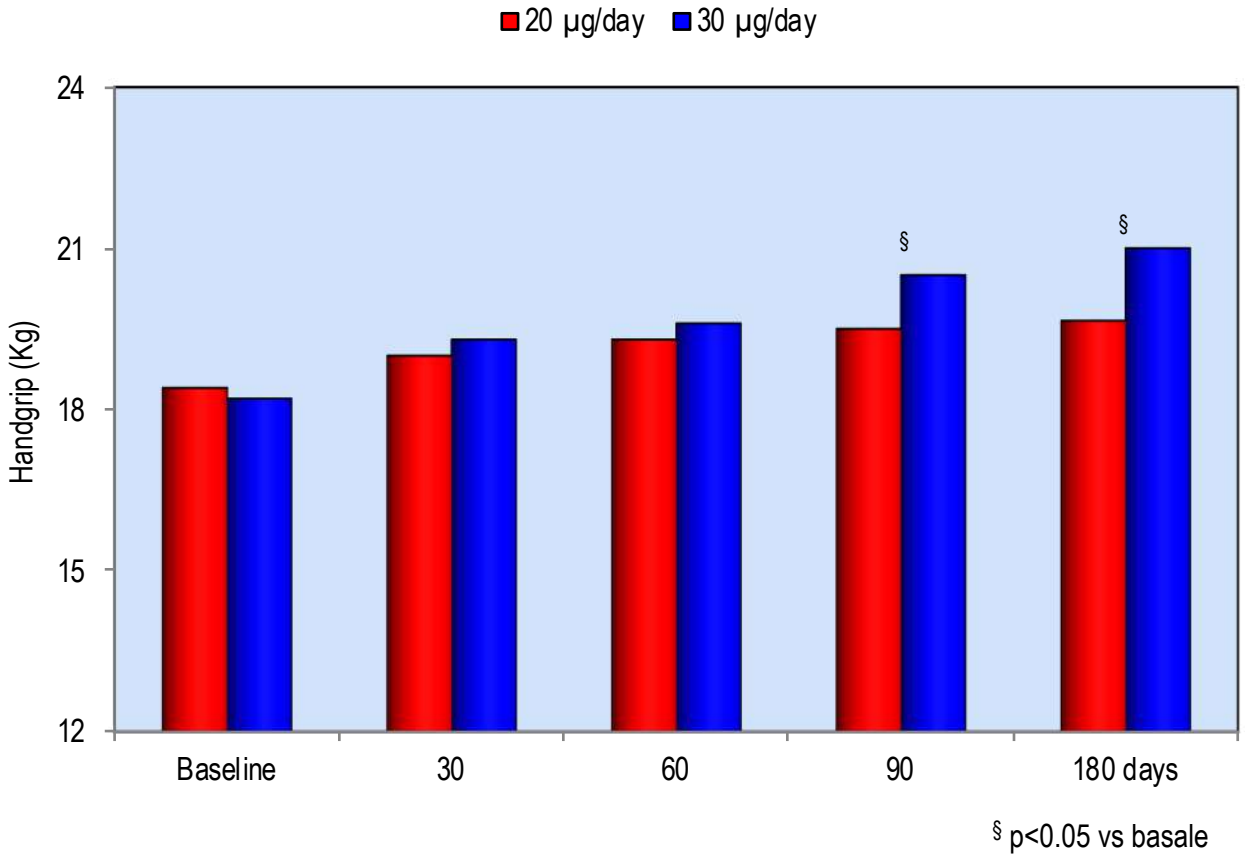
Effects of vitamin D supplementation on musculoskeletal health: a systematic review, meta-analysis, and trial sequential analysis

Mark J Bolland, Andrew Grey, Alison Avenell

Lancet Diabetes Endocrinol 2018

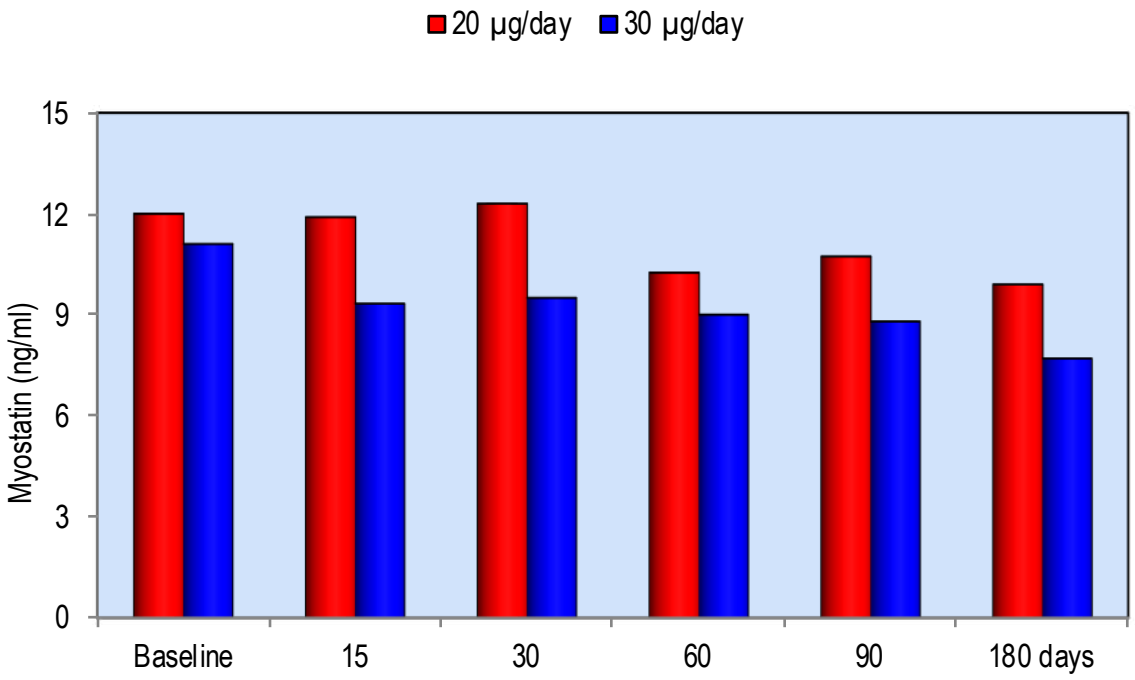


Values of Handgrip over time in participants grouped by different dose regiments of calcifediol



Gonnelli S et al. Aging Clin Exp Res. 2021

Values of Myostatin over time in participants grouped by different dose regimens of calcifediol



Gonnelli S et al. Aging Clin Exp Res. 2021

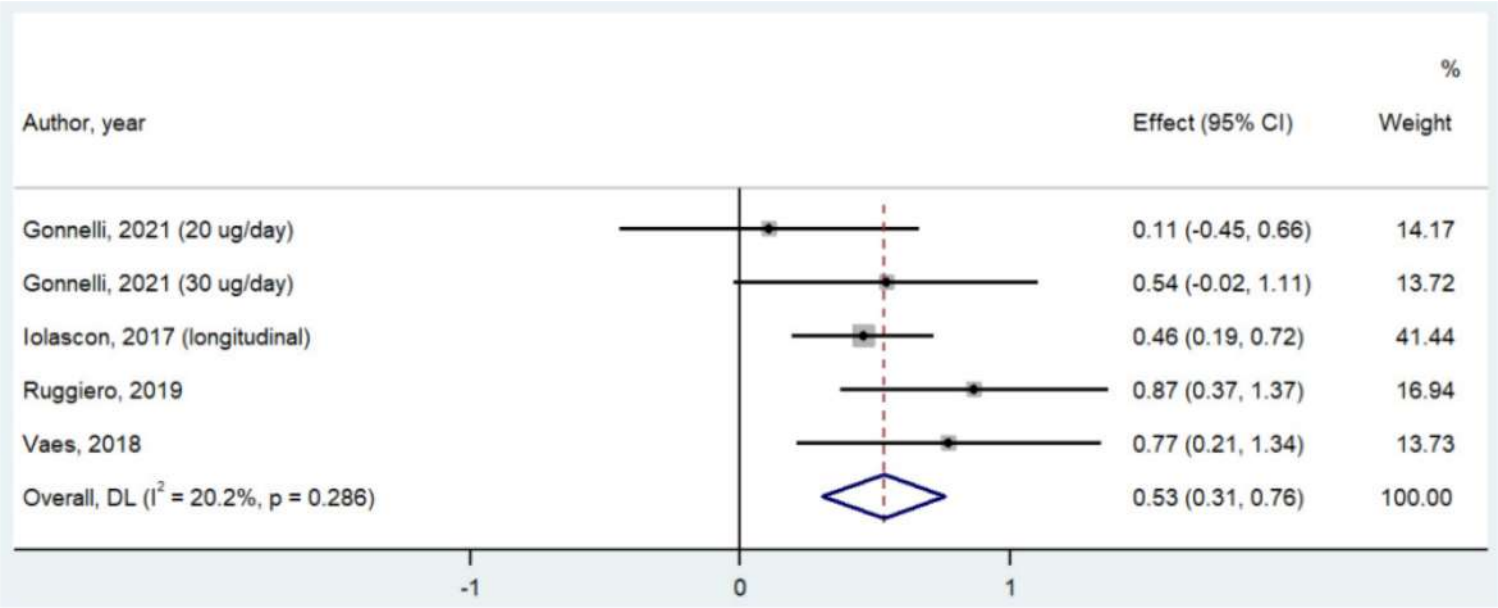
nutrients 2022

MDPI

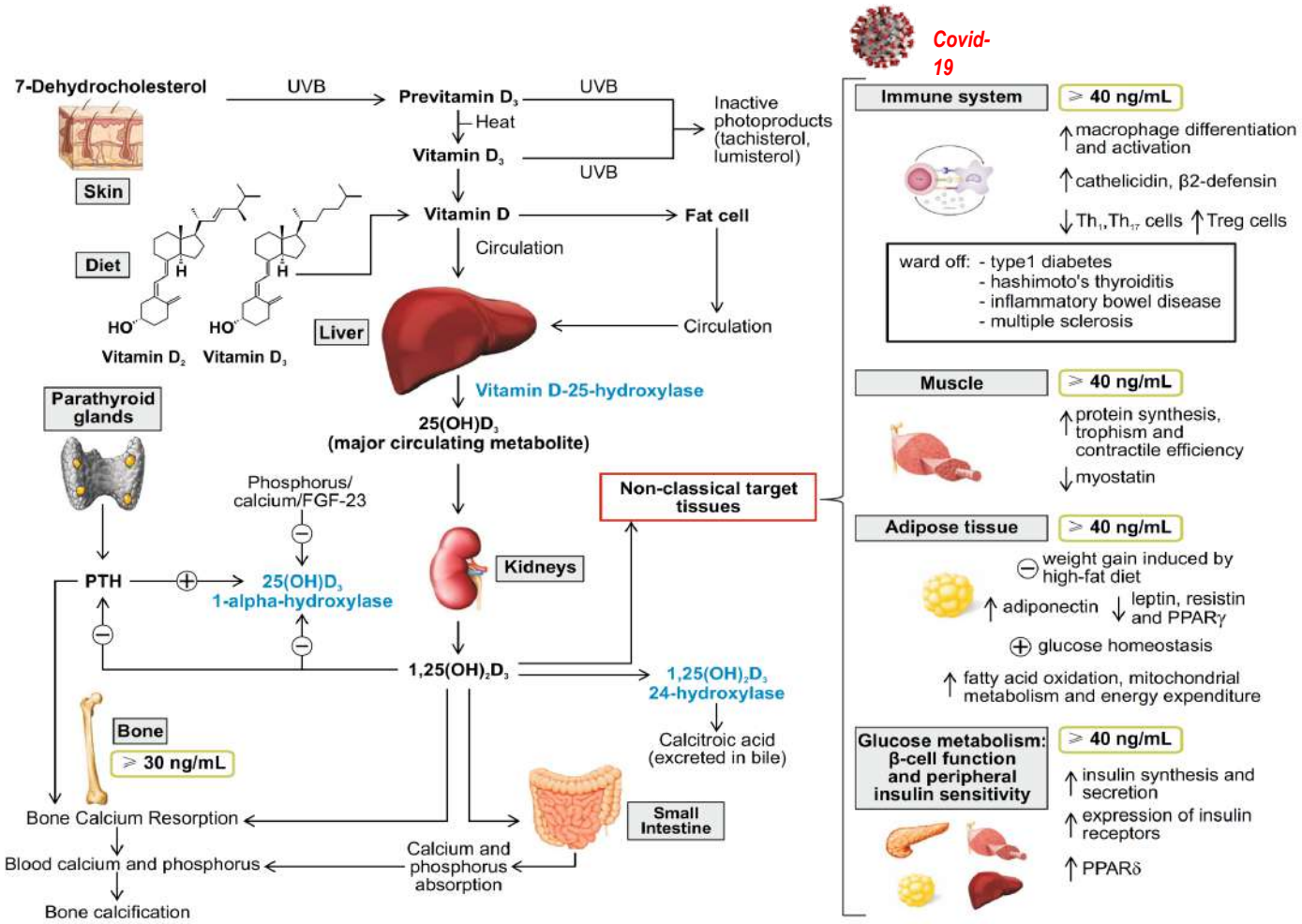
Article

Effect of Calcifediol on Physical Performance and Muscle Strength Parameters: A Systematic Review and Meta-Analysis

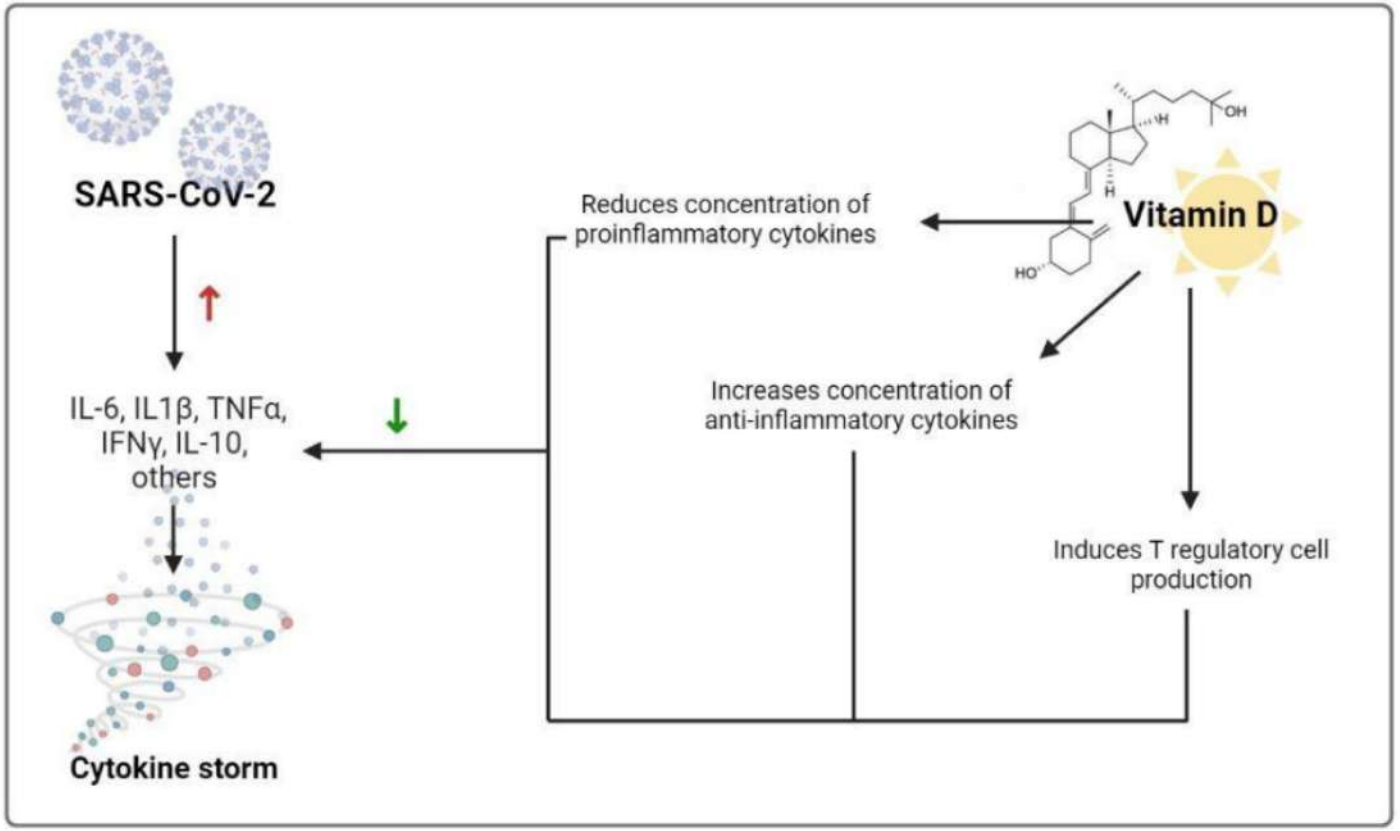
Mario Barbagallo [1], Nicola Veronese [1], Agnese Di Prazza [1], Francesco Pollicino [1], Luca Carruba [1], Anna La Carrubba [1] and Ligia J. Dominguez [1,2,*]



Classical and Non-Classical Effects of Vitamin D

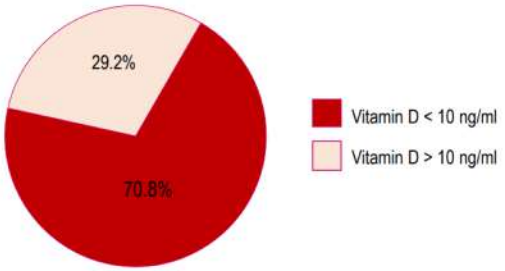


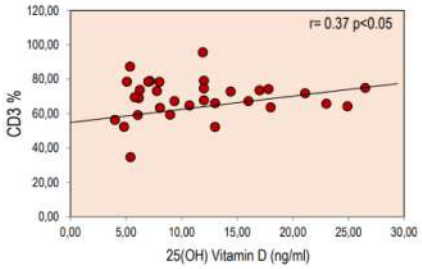
Mechanisms by which vitamin D could decrease the risk of cytokine storm

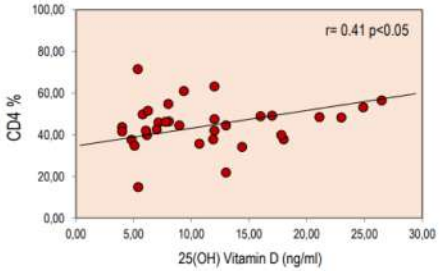


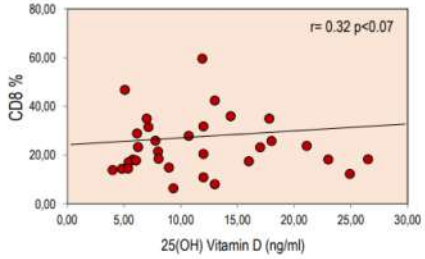
Relationship between Lymphocyte Subpopulations and Vitamin D Levels in COVID-19 Pneumonia Patients

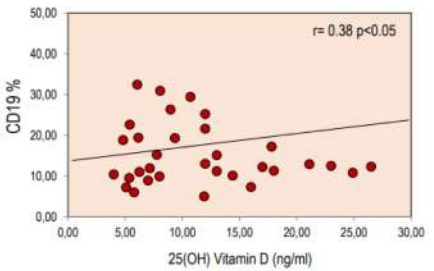
Carla Caffarelli MD PhD[1], Paolo Cameli MD[2], Miriana D'Alessandro MD[2], Elena Bargagli MD[2], Bruno Fredian MD[3], and Stefano Gonnelli MD[1]











Internal and Emergency Medicine
https://doi.org/10.1007/s11739-021-02902-w

IM - ORIGINAL

Vitamin D deficiency is associated with higher risks for SARS-CoV-2 infection and COVID-19 severity: a retrospective case–control study

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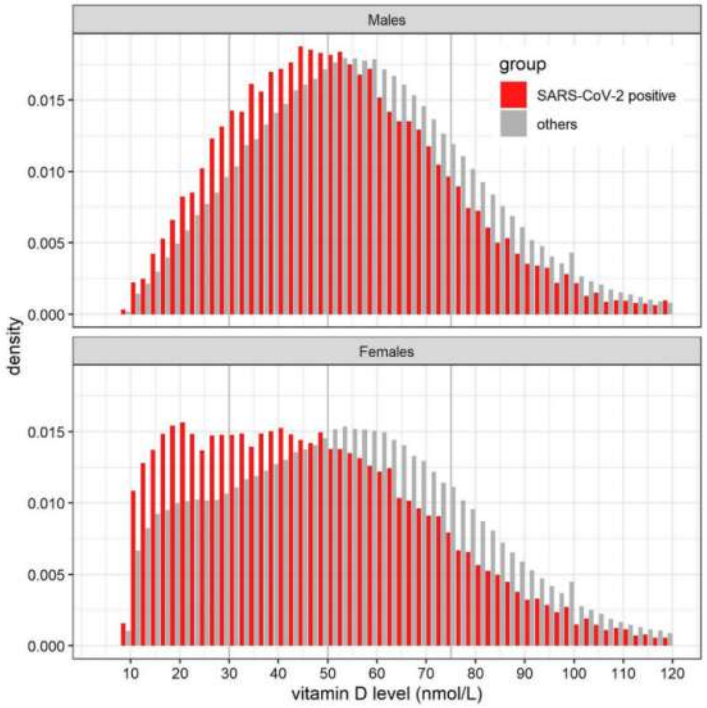
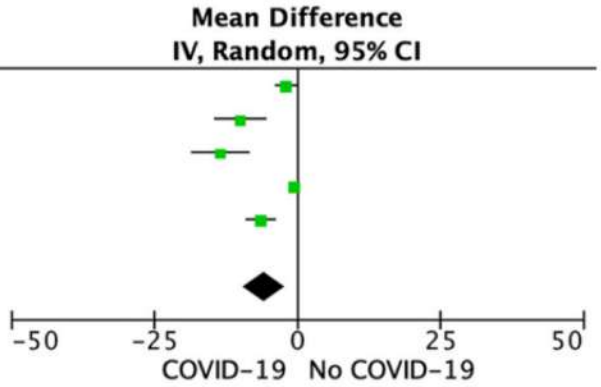


Difference in 25(OH)D levels between COVID-19 infected and non-infected patients

Study or Subgroup	COVID-19 Mean	SD	Total	No COVID-19 Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Abdollahi 2020[61]	24	7.4	201	26	10.4	201	22.1%	-2.00 [-3.76, -0.24]
Baktash 2020[37]	10.82	8.01	70	20.83	11.87	35	17.4%	-10.01 [-14.37, -5.65]
D'Avolio 2020[63]	11.1	9.5	27	24.6	16	80	16.1%	-13.50 [-18.51, -8.49]
Raisi-Estabragh 2020[64]	13.57	8	1326	14.2	8	3184	23.3%	-0.63 [-1.14, -0.12]
Ye 2020[58]	22.3	7.2	62	28.8	7.7	80	21.1%	-6.50 [-8.96, -4.04]
Total (95% CI)			**1686**			**3580**	**100.0%**	**-5.87 [-9.47, -2.28]**

Heterogeneity: $Tau^2 = 14.42$; $Chi^2 = 62.17$, df = 4 ($P < 0.00001$); $I^2 = 94\%$

Test for overall effect: Z = 3.20 (P = 0.001)



Bassatne A et al. Metabolism Clinical and Experimental 2021

Association of calcifediol treatment at admission and 25-OHD baseline serum levels with mortality

Using linearized baseline 25(OH)D levels (n = 678)

	OR	Low CI	High CI	*P*
Calcifediol treatment	0.21	0.10	0.43	< .001
Linear 25OHD	0.09	0.02	0.39	.001
Age, y	1.11	1.07	1.15	< .001
Autoimmune conditions	5.78	1.32	25.30	.02
Obesity	3.48	1.30	9.33	.013

Nogues X et al. J Clin Endocrinol Metab 2021

EXPERT REVIEW OF ANTI-INFECTIVE THERAPY
https://doi.org/10.1080/14787210.2022.2035217

Taylor & Francis
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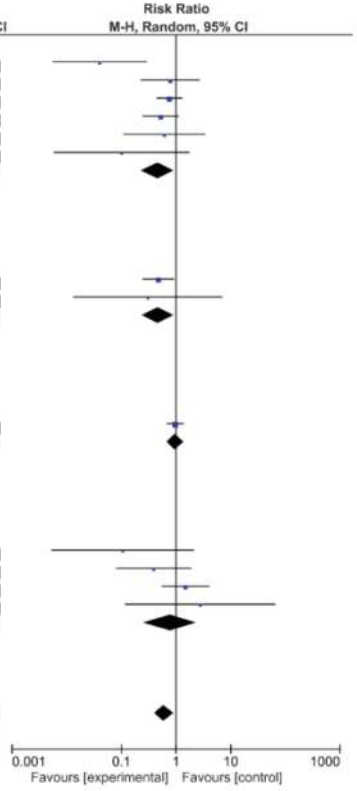
META-ANALYSIS

COVID-19 and vitamin D (Co-VIVID study): a systematic review and meta-analysis of randomized controlled trials

Seshadri Reddy Varikasuvu [a], Balachandar Thangappazham[b], Alekya Vykunta[c], Pragathi Duggina[d], Munikumar Manne [e], Hemanth Raj[f] and Sowjanya Aloori[g]

Study or Subgroup	Vitamin-D Events	Total	Control Events	Total	Weight	Risk Ratio M-H, Random, 95% CI
1.1.1 COVID-19 Severity						
Castillo ME et al., 2020 (ICU)	1	50	13	26	3.8%	0.04 [0.01, 0.29]
Lakkireddy et al., 2021 (ICU)	4	44	5	43	7.5%	0.78 [0.22, 2.72]
Murai IH et al., 2021 (ICU)	19	119	25	118	16.1%	0.75 [0.44, 1.29]
Murai IH et al., 2021 (MV)	9	119	17	118	12.7%	0.52 [0.24, 1.13]
Sabico S et al., 2021 (ICU)	2	36	3	33	4.7%	0.61 [0.11, 3.43]
Sánchez-Zuno GA et al., 2021 (Symptom severity)	0	22	4	20	2.0%	0.10 [0.01, 1.77]
Subtotal (95% CI)		**390**		**358**	**46.7%**	**0.46 [0.23, 0.93]**
Total events	35		67			
Heterogeneity: Tau² = 0.35; Chi² = 10.53, df = 5 (P = 0.06); I² = 52%						
Test for overall effect: Z = 2.16 (P = 0.03)						
1.1.2 COVID-19 RT-PCR Positivity						
Rastogi A et al., 2020 (RT-PCR+)	6	16	19	24	14.1%	0.47 [0.24, 0.92]
Sánchez-Zuno GA et al., 2021 (RT-PCR+ 14th Day)	0	22	1	20	1.7%	0.30 [0.01, 7.07]
Subtotal (95% CI)		**38**		**44**	**15.8%**	**0.46 [0.24, 0.89]**
Total events	6		20			
Heterogeneity: Tau² = 0.00; Chi² = 0.07, df = 1 (P = 0.78); I² = 0%						
Test for overall effect: Z = 2.31 (P = 0.02)						
1.1.3 COVID-19 Seropositivity						
Sánchez-Zuno GA et al., 2021(Sero+IgM/IgG 7th Day)	16	22	15	20	18.8%	0.97 [0.68, 1.39]
Subtotal (95% CI)		**22**		**20**	**18.8%**	**0.97 [0.68, 1.39]**
Total events	16		15			
Heterogeneity: Not applicable						
Test for overall effect: Z = 0.17 (P = 0.87)						
1.1.4 Deaths						
Castillo ME et al., 2020	0	50	2	26	1.8%	0.11 [0.01, 2.13]
Lakkireddy et al., 2021	2	44	5	43	5.4%	0.39 [0.08, 1.91]
Murai IH et al., 2021	9	119	6	118	9.8%	1.49 [0.55, 4.05]
Sabico S et al., 2021	1	36	0	33	1.6%	2.76 [0.12, 65.41]
Subtotal (95% CI)		**249**		**220**	**18.6%**	**0.78 [0.25, 2.40]**
Total events	12		13			
Heterogeneity: Tau² = 0.45; Chi² = 4.50, df = 3 (P = 0.21); I² = 33%						
Test for overall effect: Z = 0.44 (P = 0.66)						
Total (95% CI)		**699**		**642**	**100.0%**	**0.60 [0.40, 0.92]**
Total events	69		115			
Heterogeneity: Tau² = 0.21; Chi² = 23.25, df = 12 (P = 0.03); I² = 48%						
Test for overall effect: Z = 2.33 (P = 0.02)						
Test for subgroup differences: Chi² = 5.89, df = 3 (P = 0.12), I² = 49.0%						



Quando preferire il calcifediolo nella pratica clinica?

- Pazienti con ipovitaminosi che necessitano di iniziare terapia con farmaci anticatabolici soprattutto se per via parenterale
- Pazienti che presentano una marcata sarcopenia
- Pazienti con insufficienza epatica
- Pazienti con malassorbimento intestinale o sottoposti a chirurgia bariatrica
- Pazienti che assumono farmaci che interferiscono con l'assorbimento o con il metabolismo epatico della vitamina D

Osteoporotic fractures