Ente Ospedaliero Cantonale

Screening for Vitamin D deficiency and replacement in hospitalized patients

Olivier Giannini, Pierluigi Quadri

Ospedale Regionale Mendrisio

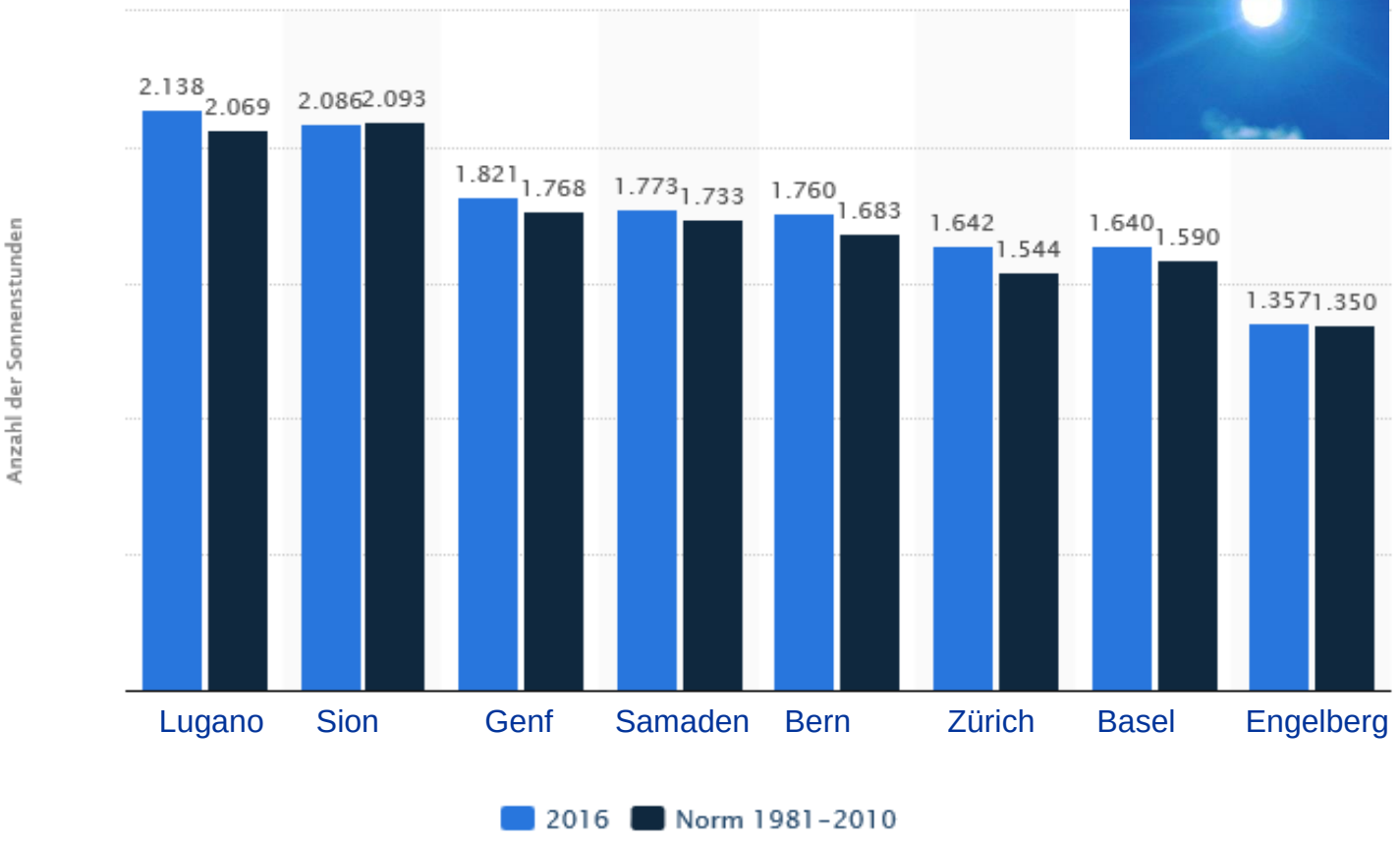
ICKS/ASIO/AMCIS, Bellinzona, 09.11.2017

Disclosure

I have no current or past relationship with commercial entities.

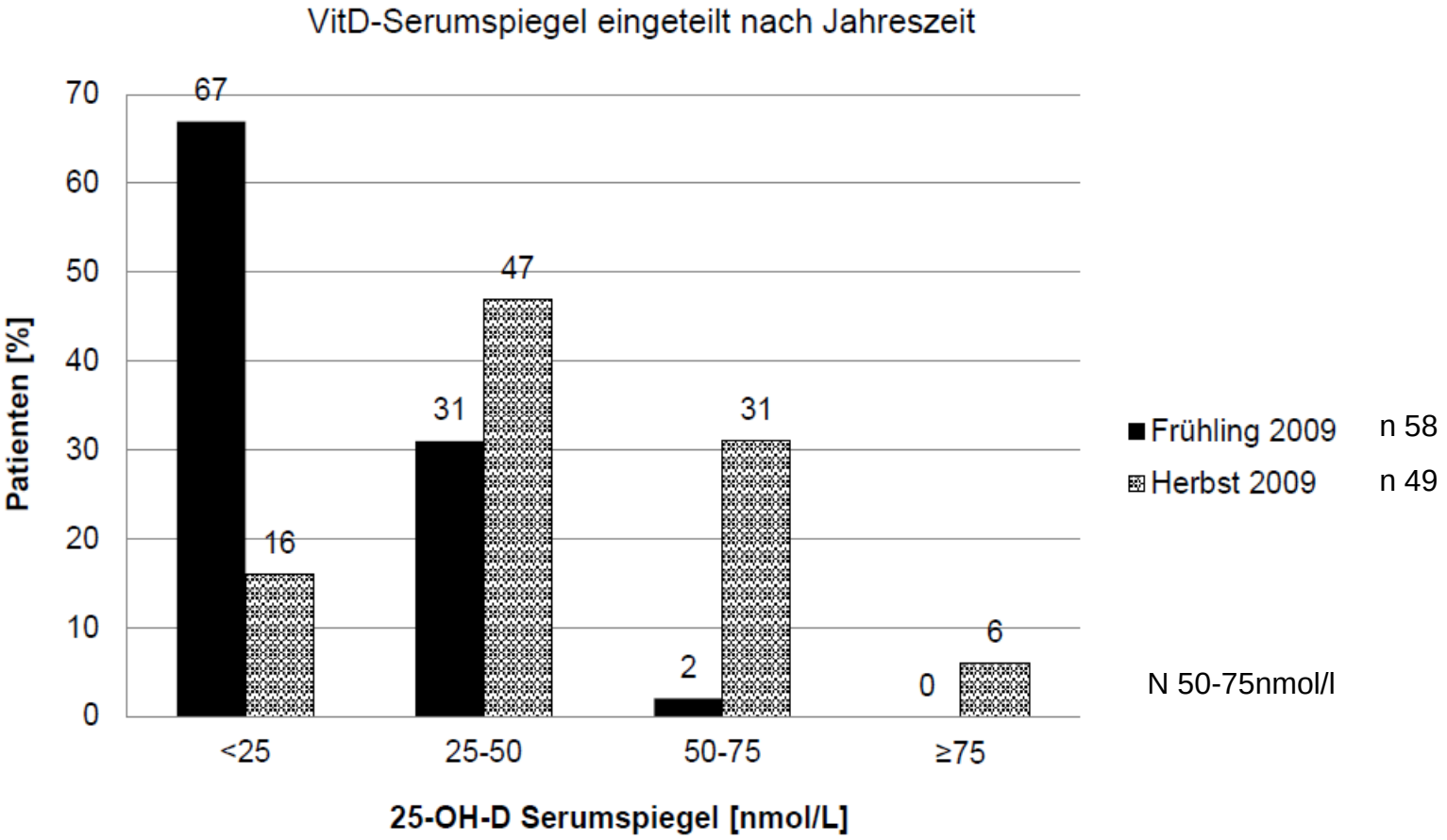
I have received no speaker’s fee for this learning activity.

Vitamin D deficiency in sunny south Switzerland



Quarenghi MC, Aubry E, Aeberhard C, Ossola N, Marone C, Stanga Z. 2017, In press (Praxis)

Vitamin D deficiency in sunny south Switzerland



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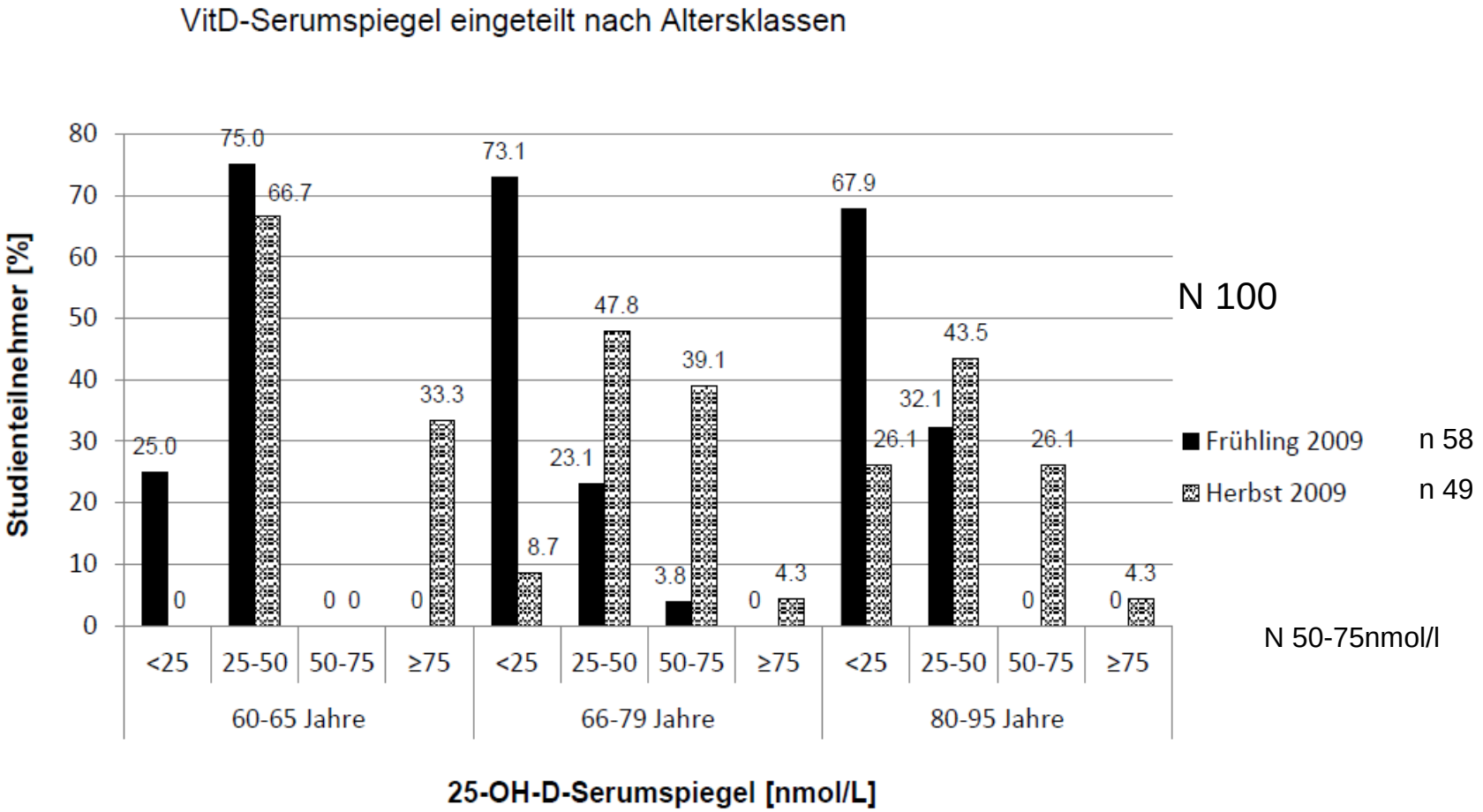
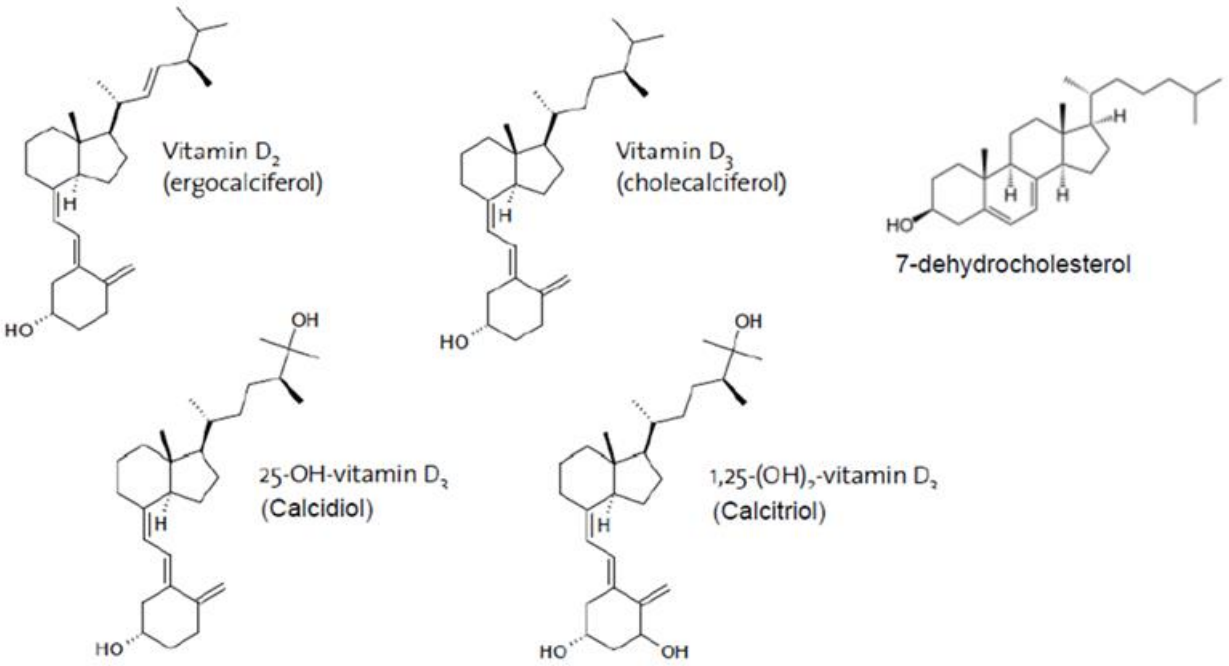
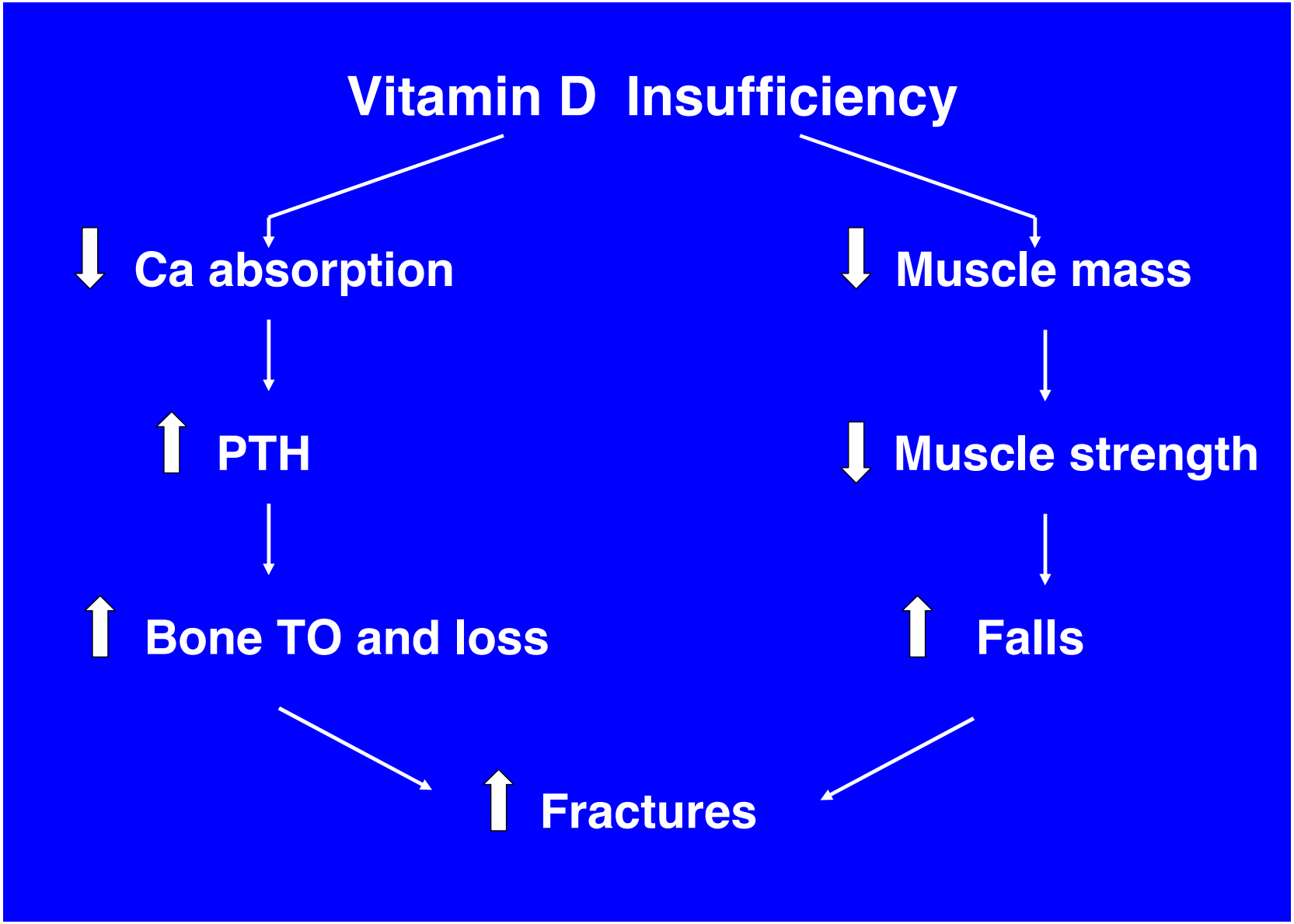


Quarenghi MC, Aubry E, Aeberhard C, Ossola N, Marone C, Stanga Z. 2017, In press (Praxis)

The total serum level of 25-OH-Vitamin D is considered to be the biomarker in the assessment of the Vitamin D level.





Holick MF et al 2006. Bischoff-Ferrari HA 2012

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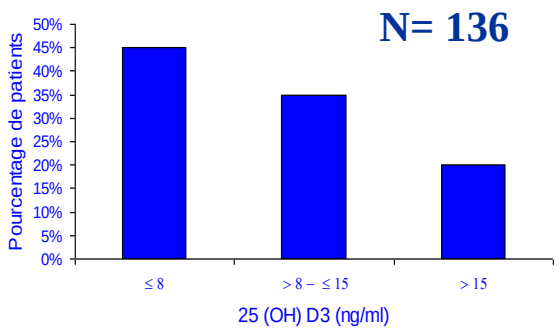
Taux de 25(OH) vitamine D (Calcidiol) et fonction musculaire chez des sujets âgés hospitalisés dans un service de gériatrie aigue

P. Quadri, M. Bertrand, G. Pesce, G. Ruggieri, M. Tettamanti, A. De Carli-Cerutti, T. Chevalley (Mendrisio; Milano, I; Genève)

Introduction: L'incapacité fonctionnelle attribuée à une diminution de la force musculaire est fréquente chez la personne âgée. Existe-t-il une relation entre cette diminution de la fonction musculaire et la présence d'une hypovitaminose D?
Objectifs: 1) Etudier la prévalence de l'hypovitaminose D dans une population de sujets âgés hospitalisés dans un service de gériatrie aigu. 2) Analyser l'association entre les fonctions motrices et le taux sérique de calcidiol. 3) Identifier les facteurs prédictifs d'une carence en calcidiol.
Sujets et méthodes: Sur une période d'une année, nous avons étudié 136 patients (âge moyen 83,0 ±6,3 ans; 74% femmes) admis consécutivement dans un service de gériatrie aigu. Une évaluation multidimensionnelle a permis de récolter des données socio-démographiques et médicales, concernant l'autonomie fonctionnelle (AVQ, AIVQ), la force musculaire (hand grip strength), la mobilité (fréquence des sorties du domicile, survenue de chutes, échelle de Tinetti pour la marche et l'équilibre) et l'état nutritionnel (BMI, MNA, albumine sérique). La concentration sérique de 25(OH)D ainsi que les taux de calcium ionisé, phosphate, phosphatase alcaline et créatinine ont été mesurés.



Résultats: Une déficience sévère (<8 ng/ml) en 25(OH)D est présente chez 45% et un déficit (<15 ng/ml) chez 80% des patients. La valeur moyenne de 25(OH)D est de 10,3 (±6,9) ng/ml (médiane 8,3 ng/ml). Une diminution de la fonction musculaire est associée à un taux bas de 25(OH)D. Les AVQ et notamment celles associées à une activité motrice (se laver, s'habiller, usage du WC, mobilité), la force de préhension (hand grip strength), la fréquence des sorties du domicile, les tests de marche et d'équilibre de Tinetti corrèlent de façon statistiquement significative ($p < .05$) avec les taux sériques de 25(OH)D. Parmi les paramètres nutritionnels, seul le MNA est significativement associé à la 25(OH)D. Une analyse multivariée montre que la fréquence des sorties du domicile (<1/semaine) et les AVQ sont associées ($p < .05$) à un risque augmenté d'une carence en 25(OH)D.
Conclusions: Chez des sujets âgés hospitalisés, l'hypovitaminose D est fréquente et s'accompagne d'une altération fonctionnelle des activités motrices. La fréquence des sorties du domicile est un marqueur prédictif simple et fiable d'une carence en 25(OH)D. Une supplémentation en vitamine D chez ces sujets carencés pourrait améliorer leur degré d'autonomie fonctionnelle.

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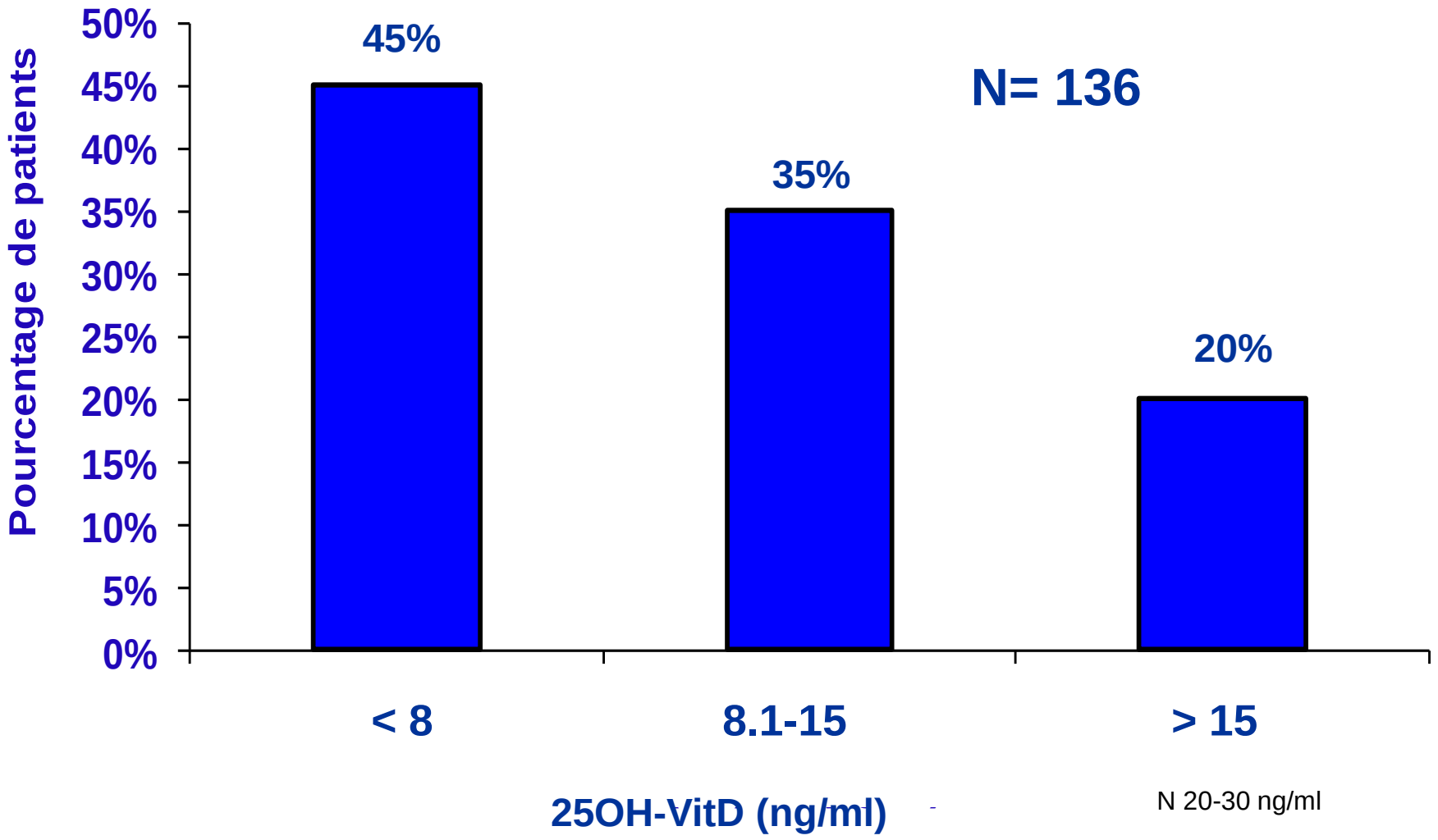
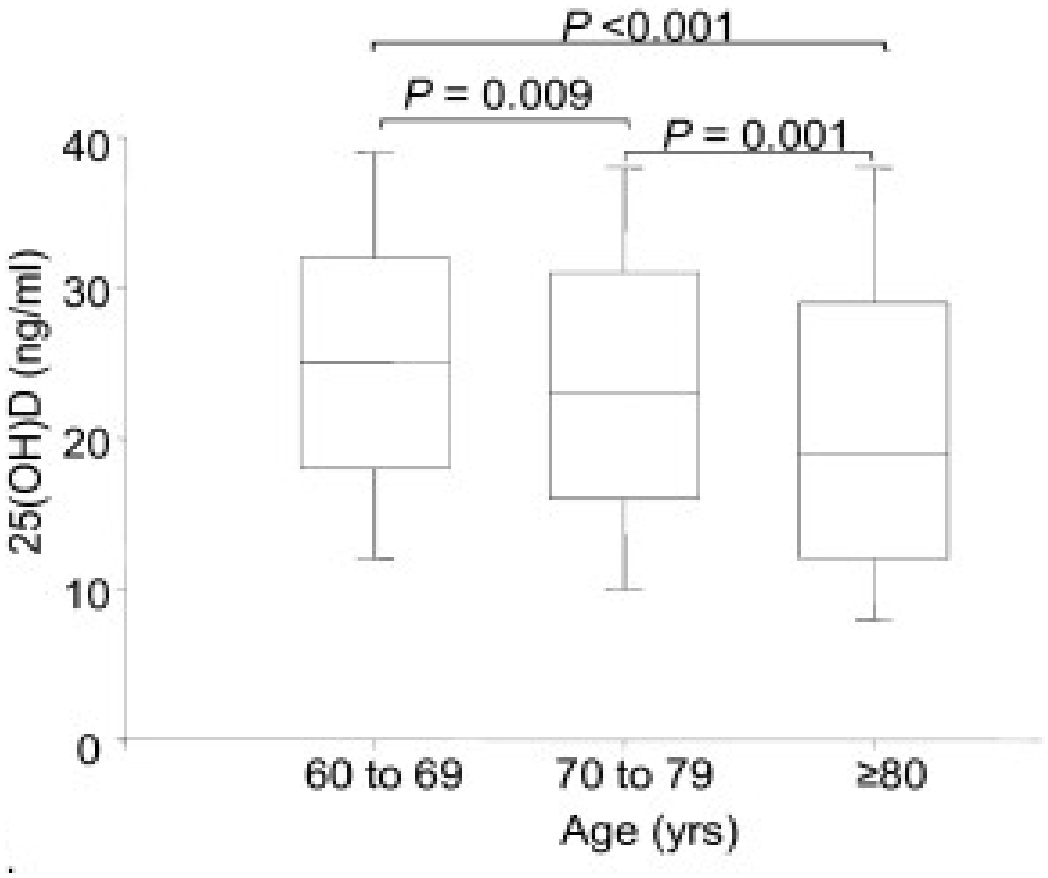
83 ± 6.3 years



Quadri PL et al. Taux de 25(OH) vitamine D et fonction musculaire chez les sujets âgés hospitalisés dans un service de gériatrie aiguë. Forum Med Suisse 2002 ; S8 :8S.

25(OH) Vit D levels in healthy Swiss citizens



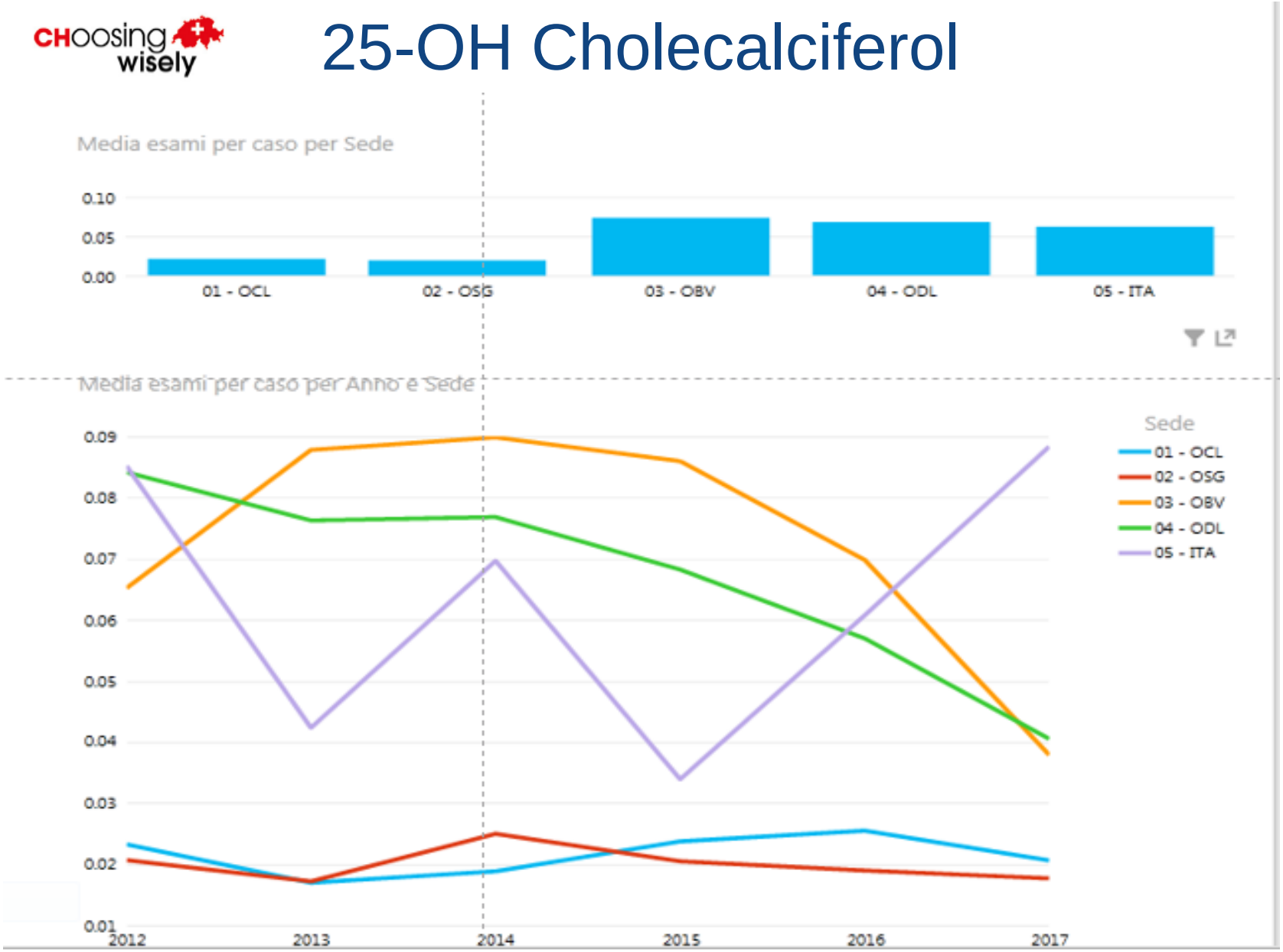
N 1230

Prevalence of VD deficiency 66% (75% in home population)

Sakem B et al. Serum concentrations of 25(OH)D and immunoglobulins in an older Swiss cohort: results of the Senior Labor Study. BMC Med. 2013;11:176.

Screening for Vitamin D deficiency and replacement in hospitalized patients

25-OH Cholecalciferol



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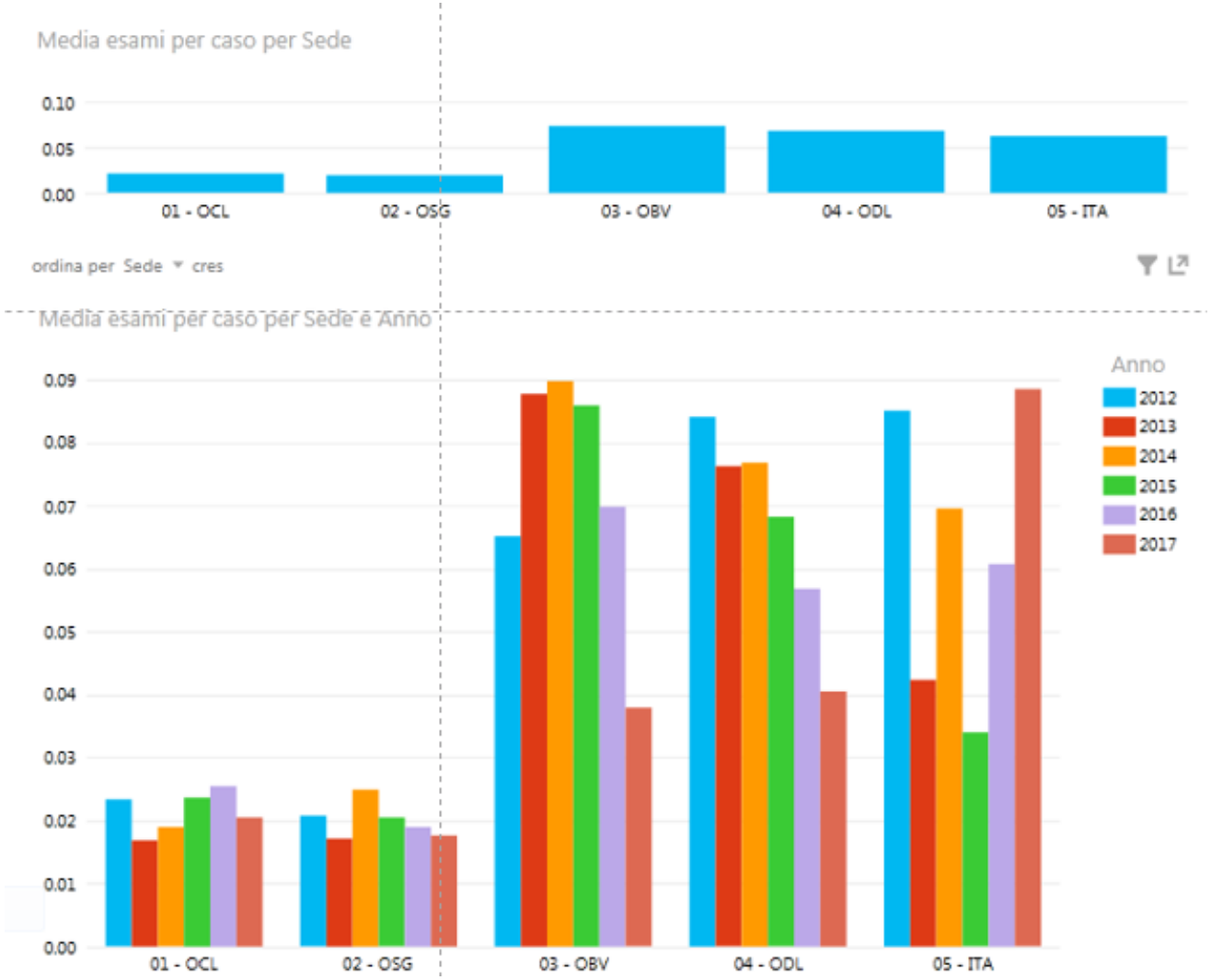
25-OH Cholecalciferol



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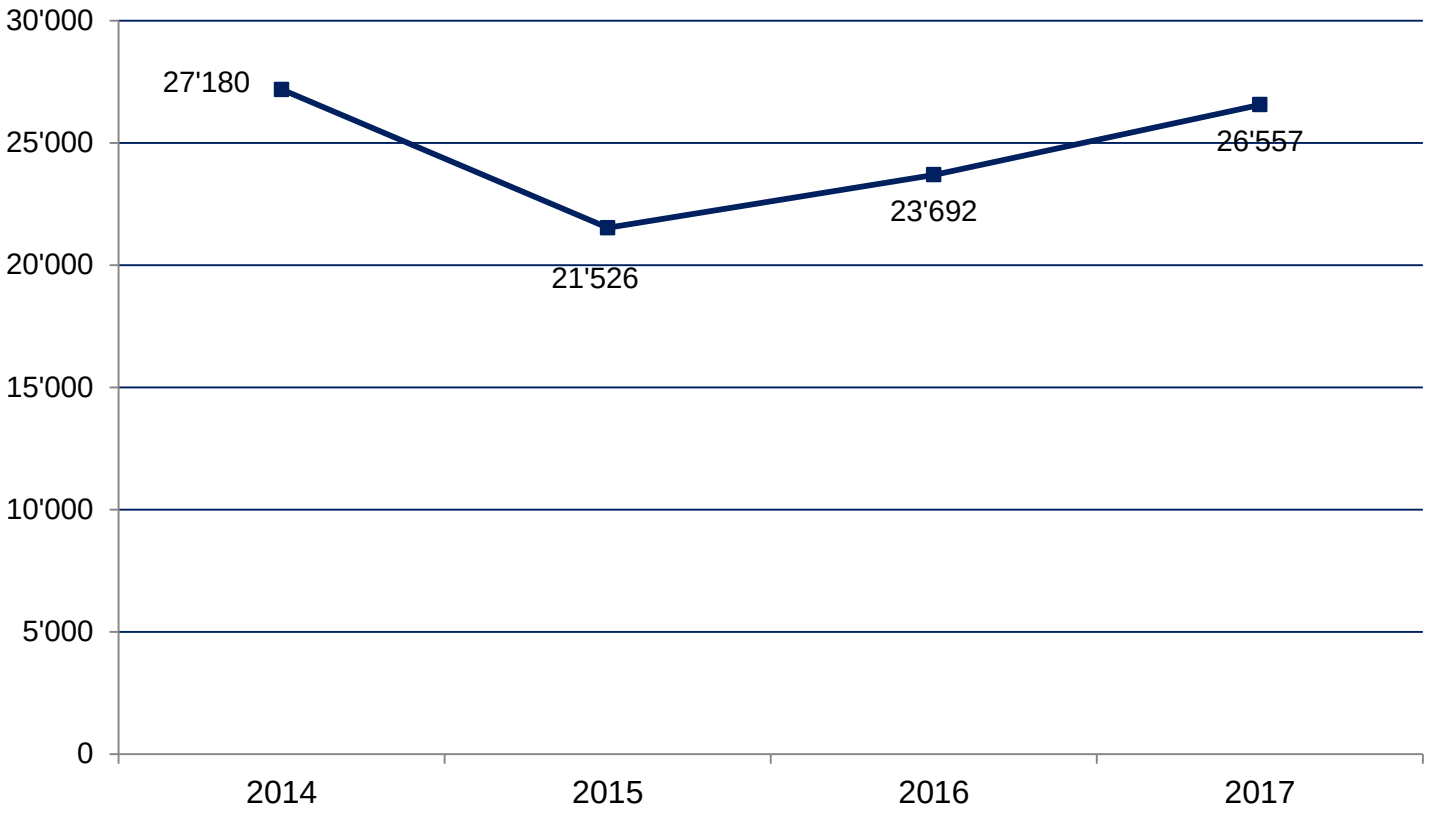
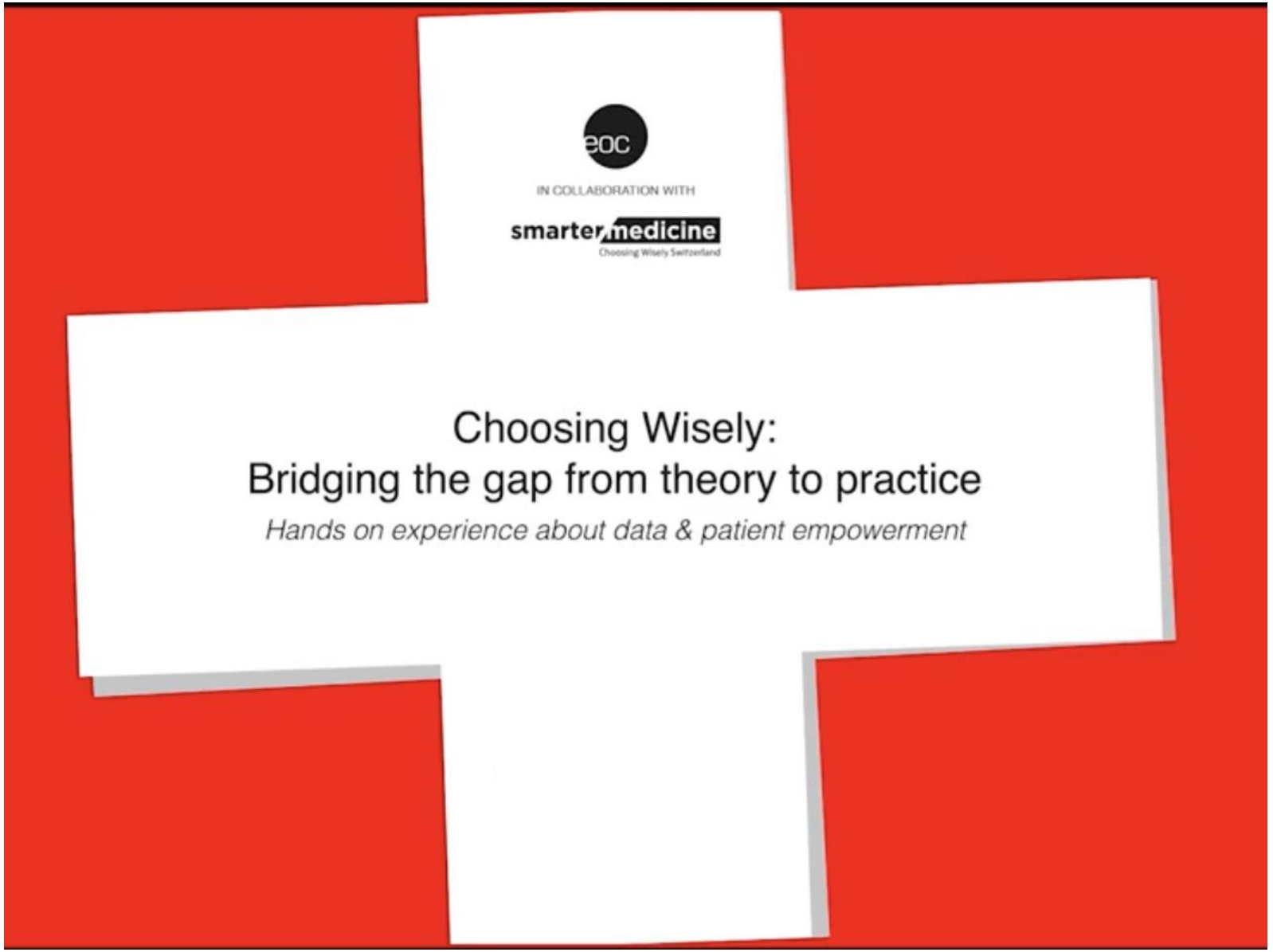
Vitamin D prescription: costs/year (EOC data)

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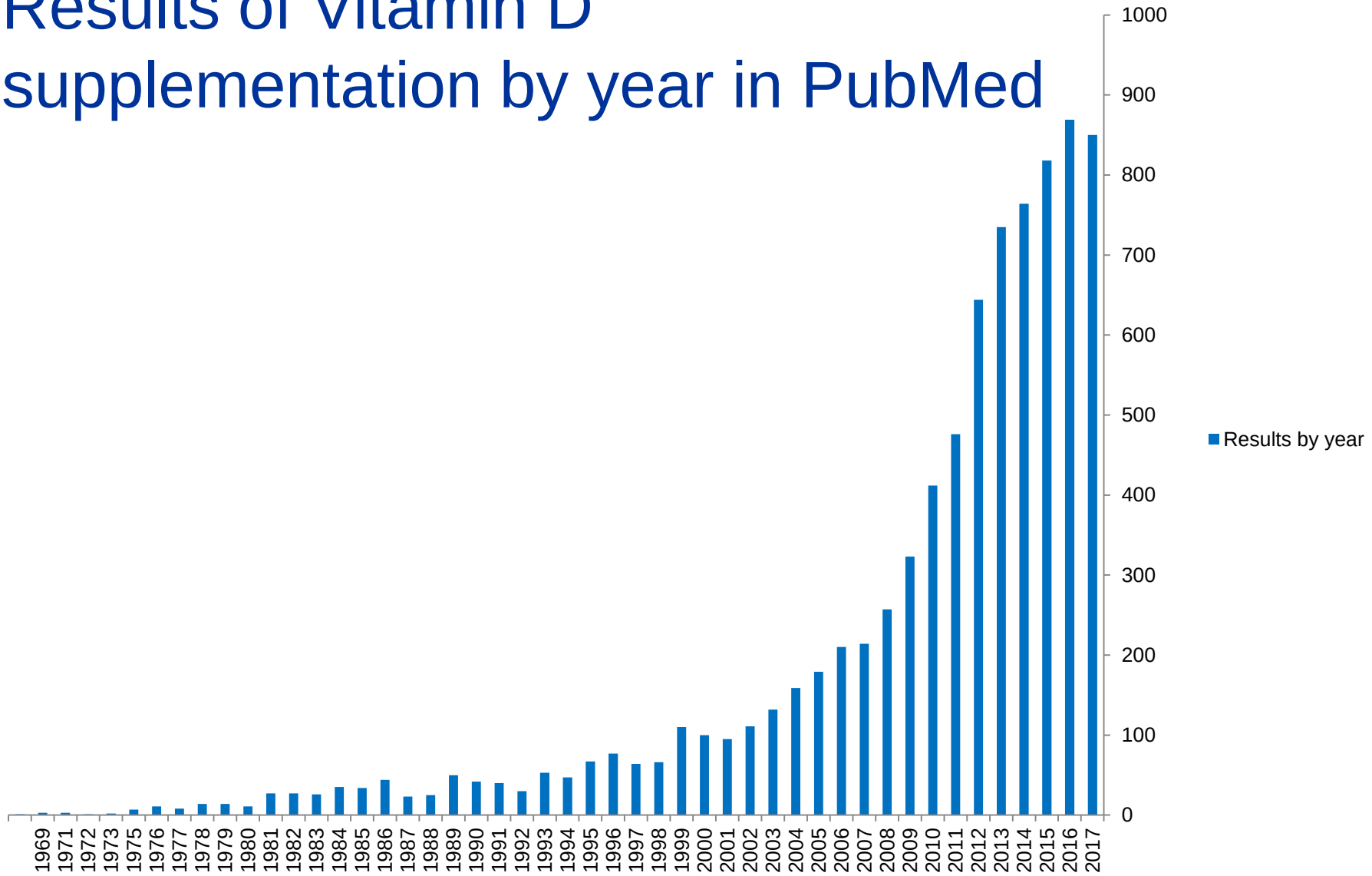
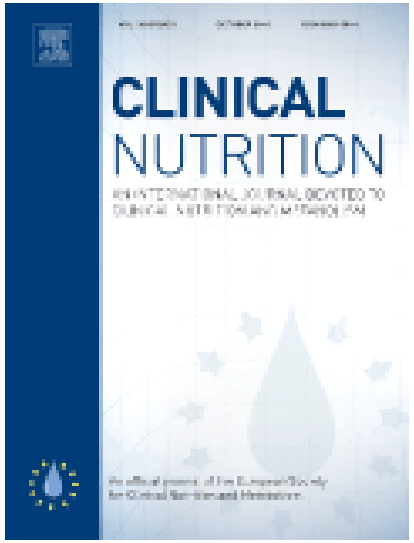
Results of Vitamin D supplementation by year in PubMed

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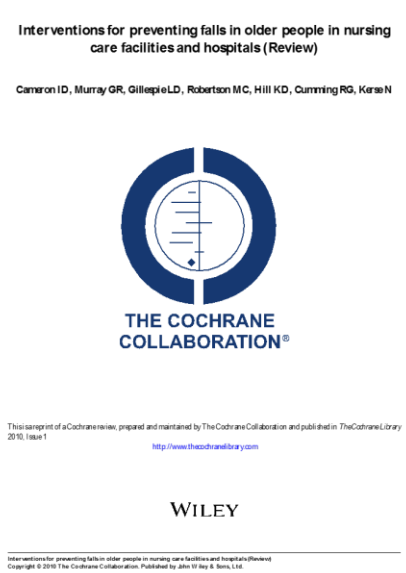
Interventions for preventing falls in older people in nursing care facilities and hospitals (Review)
Cameron ID, Murray GR, Gillespie LD, Robertson MC, Hill KD, Cumming RG, Kerse N
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This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in The Cochrane Library 2010, Issue 1
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WILEY
Interventions for preventing falls in older people in nursing care facilities and hospitals (Review)
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World Journal of Surgery
Springer

NUTRITION

Vitamin D Supplementation and Increased Risk of Falling
A Cautionary Tale of Vitamin Supplements Retold

Steven R. Cummings, MD; Douglas P. Kiel, MD, MPH; Dennis M. Black, PhD

The randomized clinical trial (RCT) by Bischoff-Ferrari et al[1] in this issue of *JAMA Internal Medicine* shows that vitamin D supplementation is associated with the risk of falls. Two "high" doses (60 000 IU of vitamin D_3 per month or 24 000 IU vitamin D_3 plus 300 mg of calcifediol per month) achieved a serum 25-hydroxyvitamin D (25[OH]D) level of 30 ng/mL in 80% of participants, a level that has been recommended as best for reducing the risk of fractures and for other health benefits (to convert 25[OH]D to nanomoles per liter, multiply by 2.496).[2,3] However, compared with a dose of 24 000 IU of vitamin D_3 per month (equivalent to 800 IU per day), the higher doses had no effect on lower extremity physical performance and increased the risk of falls. A previous RCT[4] in women of the same age showed that 500 000 IU of vitamin D per year achieved serum 25(OH)D levels of at least 30 ng/mL in most participants but significantly increased risk of falls by 15% and fractures by 26%.

Related article

A theoretical possibility has been raised that periodic administration of high doses of vitamin D accounts for the increased risk of falls and fractures.[5] That hypothesis should be tested by placebo-controlled trials showing that a daily dose of 2000 IU, for example, reaching serum 25(OH)D levels of at least 30 ng/mL reduces the risk of falls and fractures.

The trial in this issue[1] had no placebo group and, therefore, could not test the effects of supplementation with 800 IU of vitamin D per day. However, a recent placebo-controlled trial by Uusi-Rasi et al[6] found that an 800 IU per day supplement had no effect on physical function or risk of falls or injurious falls, whereas an exercise program reduced the risk of injurious falls by about half. Another trial found that 800 IU daily had no effect on lower extremity function or risk of falls in postmenopausal women 75 years or younger.[7]

It is uncertain whether any dose of vitamin D supplementation reduces the risk of falls or fractures in community-dwelling older adults. Previous meta-analyses of RCTs had differed about whether vitamin D supplements reduce the risk of falls[8-11] or fractures[8,12-14] in community-dwelling elderly individuals. In contrast meta-analyses[15-17] have shown that 800 IU of vitamin D and 1200 mg of calcium reduced the risk of hip fracture and mortality for patients dwelling in institutions. These patients should receive calcium and vitamin D supplements.

Clinicians should not recommend vitamin D supplements for other putative health benefits. There is no evidence from meta-analyses of RCTs that vitamin D supplementation reduces the risk of cardiovascular disease or cancer.[13,18] In addition, a recent trial[19] found that 1000 IU of vitamin D per day, with or without calcium, did not decrease the risk of colon cancer or recurrent adenomas in those with a history of colon adenomas.

The vitamin D story seems to be following the familiar pattern observed with antioxidant vitamins. Enthusiasm for the health benefits of vitamin supplements is coupled with the belief that "vitamins" are inherently safe and reinforced by observational studies showing, essentially, that healthy people have higher vitamin levels. Then RCTs and meta-analyses[20] proved that the supplements in fact increase mortality (β-carotene, vitamin E), or have no health benefits (vitamin A, vitamin C).

The strategy of supplementation with vitamin D to achieve serum levels of at least 30 ng/mL has not been established by RCTs to reduce the risk of falls and fractures. It may increase the risk of falling. Until that approach is supported by randomized trials with updated meta-analyses, it would be prudent to follow recommendations[21] from the Institute of Medicine (IOM) that people 70 years or older have a total daily intake of 800 IU of vitamin D without routine measurement of serum 25(OH)D levels. It is prudent to get recommended intakes of vitamin D and other vitamins from a balanced diet with foods that naturally contain what is manufactured into supplements.

Clinicians should not recommend vitamin D supplements for other putative health benefits. There is no evidence from meta-analyses of RCTs that vitamin D supplementation reduces the risk of cardiovascular disease or cancer.[13,18] In addition, a

ARTICLE INFORMATION

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Corresponding Author: Steven R. Cummings, MD, San Francisco Coordinating Center, Coordinating Center, 185 Berry Street, Lobby 5, Suite 5700, San Francisco, CA 94107 (scummings@sfcc-cpmc.net).

Published Online: January 4, 2016. doi:10.1001/jamainternmed.2015.7568.

Conflict of Interest Disclosures: None reported.

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3. Dawson-Hughes B, Mithal A, Bonjour JP, Boonen S, Burckhardt P, Fuleihan GE, et al IOF position statement: vitamin D recommendations for older

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ASCP American Society for Clinical Pathology

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Don't perform population based screening for 25-OH-Vitamin D deficiency.

Vitamin D deficiency is common in many populations, particularly in patients at higher latitudes, during winter months and in those with limited sun exposure. Over the counter Vitamin D supplements and increased summer sun exposure are sufficient for most otherwise healthy patients. Laboratory testing is appropriate in higher risk patients when results will be used to institute more aggressive therapy (e.g., osteoporosis, chronic kidney disease, malabsorption, some infections, obese individuals).

RESEARCH LETTER

LESS IS MORE

Testing Vitamin D Levels and Choosing Wisely

Box. Text for New, Criteria-Based Requisition for Vitamin D

All medically necessary 25-hydroxy vitamin D testing will be supported by Alberta Health. Any 25-hydroxy vitamin D testing that does not meet the testing criteria listed below will be deemed not medically necessary and will not be performed. (Check all that are appropriate for your patient.)

Metabolic bone disease

Abnormal blood calcium level

Malabsorption syndrome (eg, celiac disease, small-intestinal surgery, anticonvulsant agents)

Chronic renal disease

Liver disease

JAMA Internal Medicine Published online May 23, 2016

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LESS IS MORE

Testing Vitamin D Levels and Choosing Wisely

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6. Ferrari R, Prosser C. Testing Vitamin D Levels and Choosing Wisely. JAMA Internal Medicine.2016.1929.
7. Avenell A, Gillespie WJ. Gillespie LD, O'Connel D. Vitamin D and Vitamin D analogues for preventing fractures associated with involutional and post-menopausal osteoporosis. JAMA 2010;303:1815

Low levels of Vitamin D, which are especially frequent in institutionalized elderly, reduce their neuromuscular functions and increase brittle bones with the risk of falls and fractures.

The hypothesis that Vitamin D supplementation can reduce this risk in the institutionalized elderly and those who are generally very frail is based on these suppositions.

The evidence available suggests that Vitamin D supplements are effective in reducing the risk of fractures only in the institutionalized elderly.

On the other hand Vitamin D supplementation is ineffective in those living at home while possible side effects cannot be excluded.

In «frail patients» and in institutionalized elderly, the number of patients treated to prevent a hip fracture (NNT) turned out to be 36, like the number of patients to be treated in order to observe an adverse event (NNH). On the other hand, Vitamin D supplementation was seen to be ineffective in people living at home (NNT could not be calculated), while possible undesired side effects cannot be excluded (NNH=36).

Vitamin D and vitamin D analogues for preventing fractures associated with involutional and post-menopausal osteoporosis

Alison Avenell[1], William J Gillespie[2], Lesley D Gillespie[3], Dianne O'Connell[4]

[1]Health Services Research Unit, University of Aberdeen, Aberdeen, UK. [2]Hull York Medical School, University of Hull, Hull, UK. [3]Department of Medical and Surgical Sciences, Dunedin School of Medicine, University of Otago, Dunedin, New Zealand. [4]Cancer Epidemiology Research Unit, The Cancer Council NSW, Sydney, Australia

The Cochrane Library, 2014

However, in order to reduce the risk of falls and fractures in long-stay settings, the importance of other options which are central in association with Vitamin D supplementation must always be considered such as physical exercise, multi-dimensional strategies (e.g. making staff aware or changes in the surroundings) and also interdisciplinary strategies (e.g. paying attention the the pharmacological prescription or the prevention of post-prandial hypotension).

Vitamin D: probably not for all

Vitamina D: non per tutti in(D)spensabile

Screening e sostituzione della Vitamina D nell'ottica Choosing Wisely

When to assess vitamin D status

- Patients with metabolic bone diseases, such as osteoporosis or disorders of the calcium-phosphorous metabolism.
- Patients with the malabsorption syndrome, including those with celiac disease or on anti-epileptic medication, steroids, retro virals.
- Patients after intestinal surgery, especially of the small intestine.
- Patients with chronic kidney diseases (in this case also associated with the dosage of ionized calcium, phosphates and an intact value of parathormone / iPTH).
- Patients with chronic liver diseases.

When NOT to assess Vitamin D status

[1]Elderly patients in good health, since they do not require Vitamin D supplements.

[2]Frail elderly patients, since they should benefit from Vitamin D supplements in suitable doses. The administration of Vitamin D in such patients does not require any preliminary analysis of the serum level, since it has no significant side effects.

[1]No dependance in daily activities and/or in the person's care, no geriatric syndromes, no relevant co- morbidity.

[2]Evidence of some dependance in daily activities and/or in the person's care, plus moderately severe co-morbidity or one single severe co-morbidity, one or more geriatric syndromes.

How much Vitamin D (Cholecalciferol) to administer

Objective for a serum level of 20-30 ng/ml (50-75 nmol/l)

Vitamin D3 800 U/die associated with 500mg of ionized calcium/die.

Nome commerciale	Contenuto e tipo di Calcio	Contenuto Vitamina D3	Forma galenica
Calcimagon® - D3	500mg Calcio ionizzato (=1250mg Calcio carbonato)	800 IU	compresse da masticare
Calcium D3 Sandoz® 1000/880	1000mg Calcio ionizzato	880 IU	sacchetti in polvere
Calcium D3 Sandoz® 500/440	500mg Calcio ionizzato	440 IU	sacchetti in polvere
Calcium Sandoz® 1000mg	1000mg Calcio ionizzato	-	compresse
Vi-De 3® Tropfen	-	100 IU/gtt (4'500 IU/ml)	gocce perorali
Vitamin D3 Wild ® oleose	-	500 IU/gtt (20'000 IU/ml)	gocce perorali

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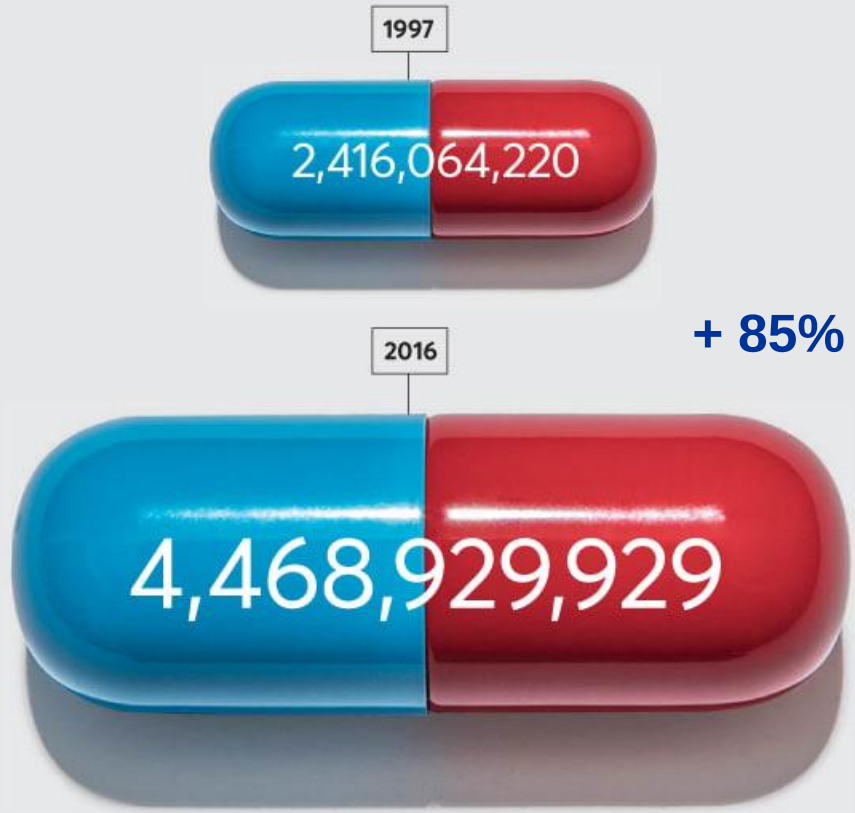
Cholecalciferol (Vit. D3) 800 I.E.
Zitronengeschmack
Goût de citron
Calcimagon®-D3
60 Kautabletten comprimés à mâcher
500 mg/400 I.E.
Calcium/Vit. D3
Zitronengeschmack
Goût de citron
Lactose- und Glutenfrei
Sans lactose et gluten

Pill Nation: The Rise of Rx Drug Use

The total number of prescriptions filled by all Americans, including adults and children, has increased by 85 percent over two decades, while the total U.S. population has increased by only 21 percent.



Source: Quintiles IMS.

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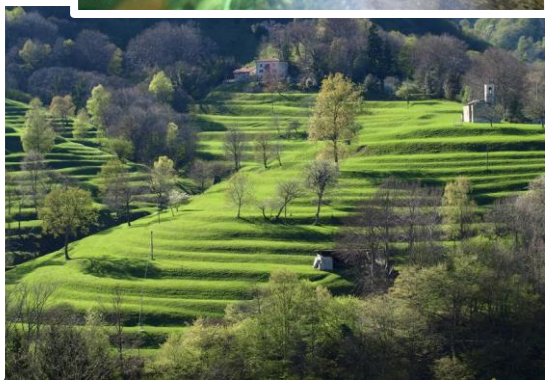
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