XII CONGRESSO NAZIONALE FIMP 2018

Tutti i bambini... un unico stivale!

fimp Federazione Italiana Medici Pediatri

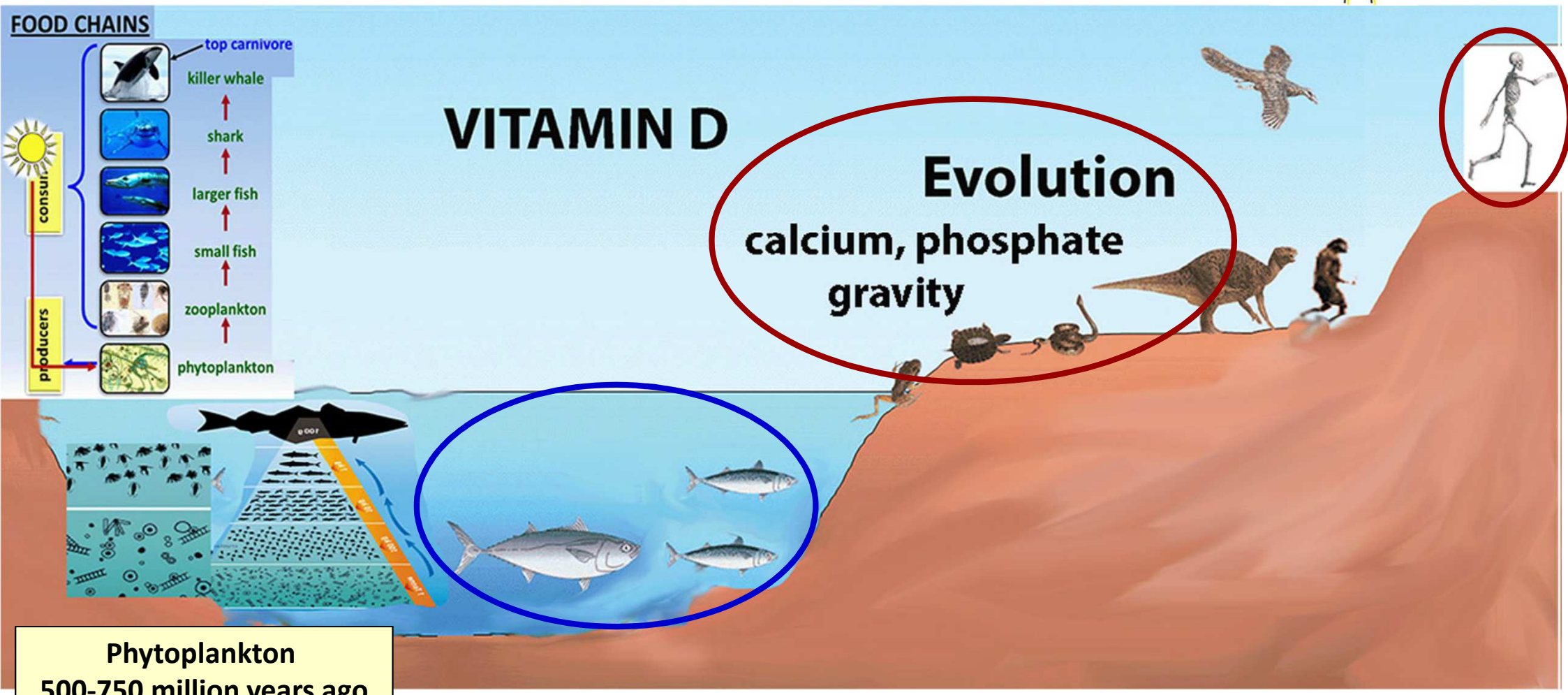
AIM GROUP INTERNATIONAL

Francesco Vierucci

LA VITAMINA D OLTRE IL PRIMO ANNO: IL RUOLO NELLA SECONDA E TERZA INFANZIA

Sistema Muscolo-scheletrico

The vitamin D story



Phytoplankton
500-750 million years ago
(to protect DNA from UVB)

(Hernigou P et al. Int Orthop Mar 2018)

American Journal of Public Health
and THE NATION'S HEALTH

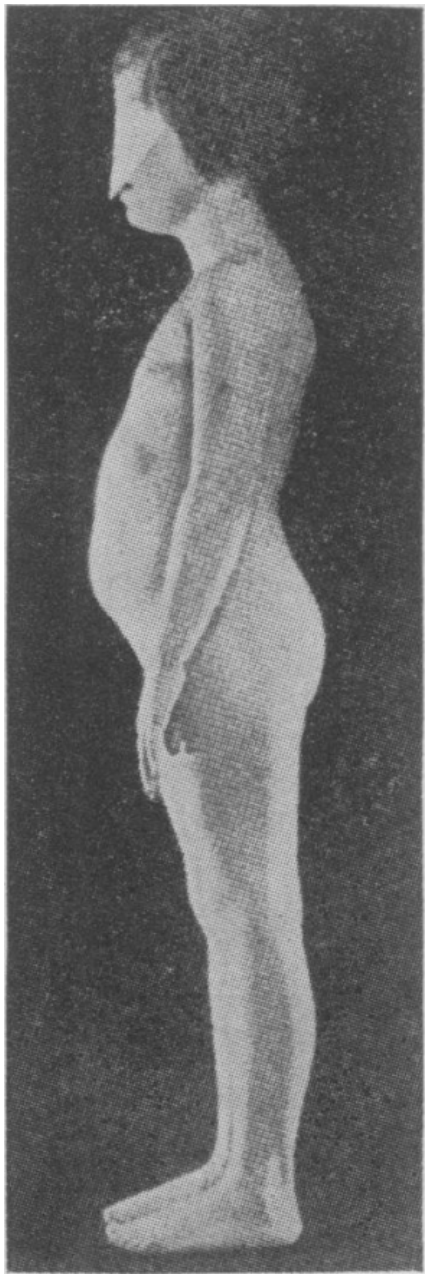
Volume 26 July, 1936 Number 7

Vitamin D in Child Health*

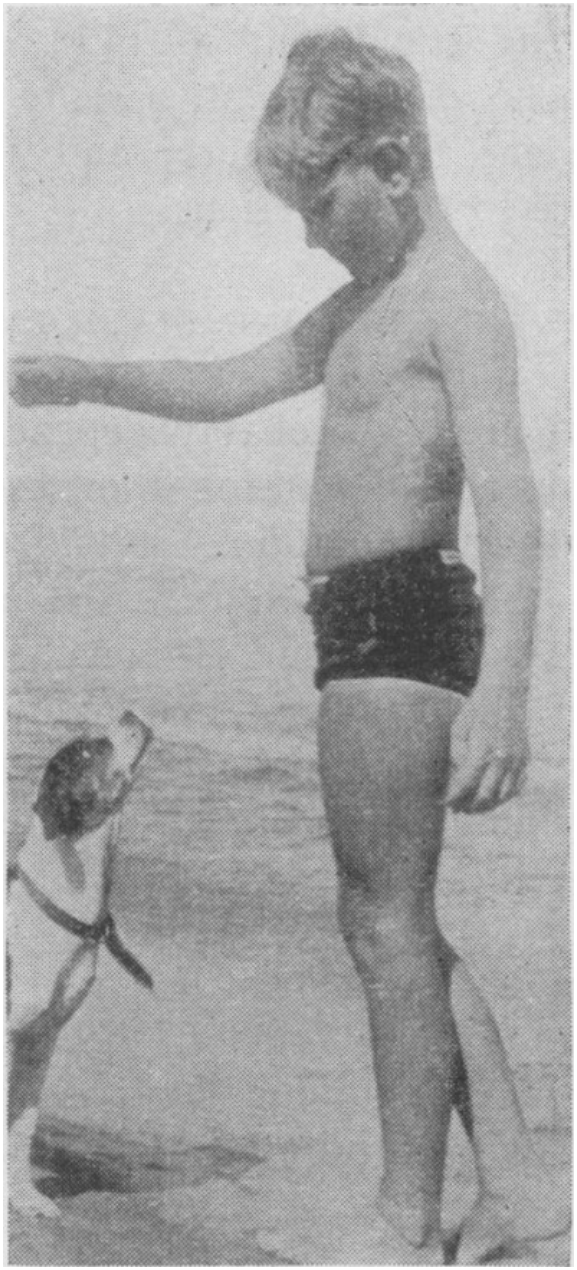
FRED O. TONNEY, M.D., F.A.P.H.A.

The influence of vitamin D upon the child's physical development is viewed from the standpoint of:

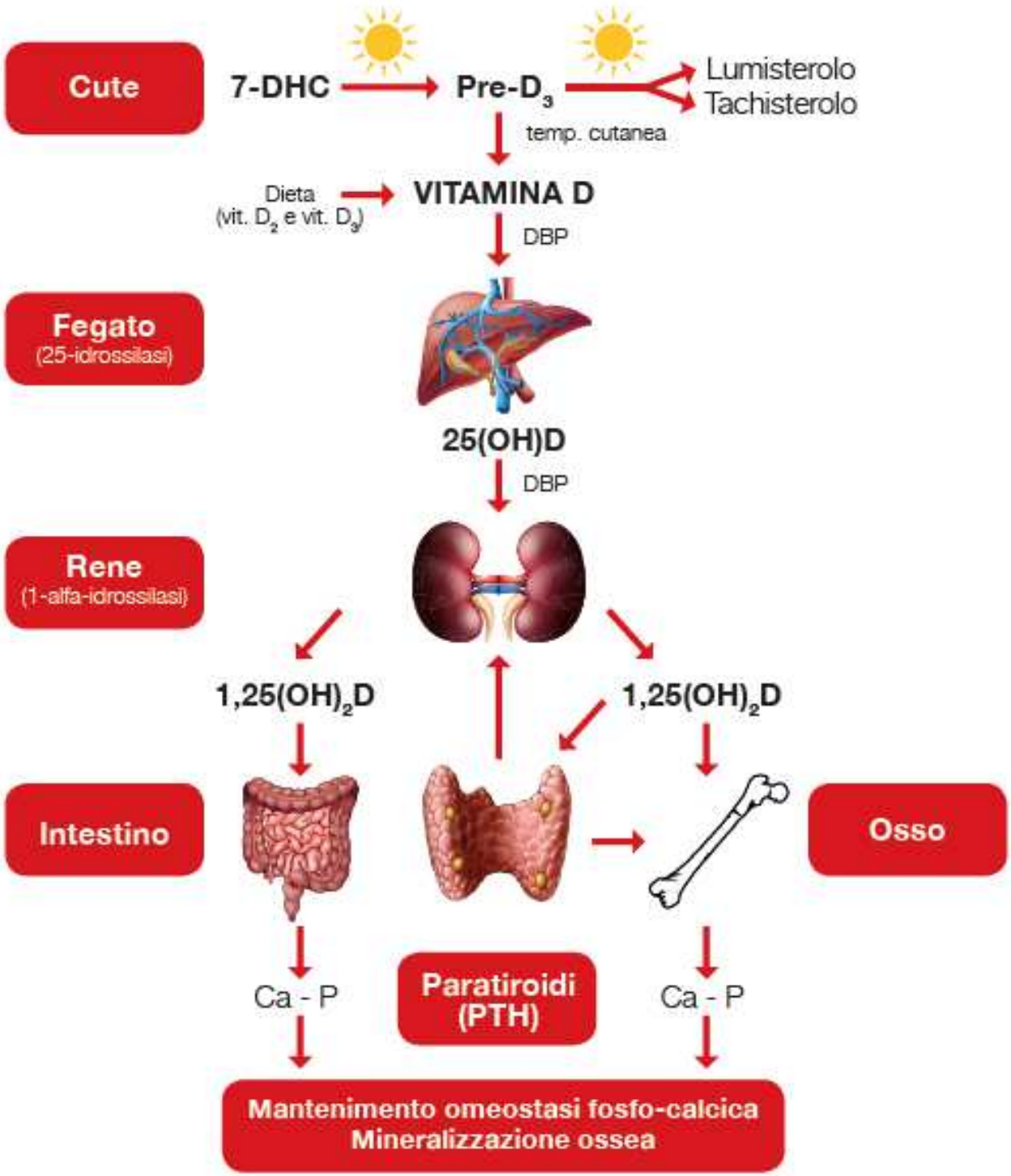
- **growth,**
- **bone development,**
- **tooth development,**
- **posture,**
- **resistance to the infections.**



A rachitic child in typical lax posture

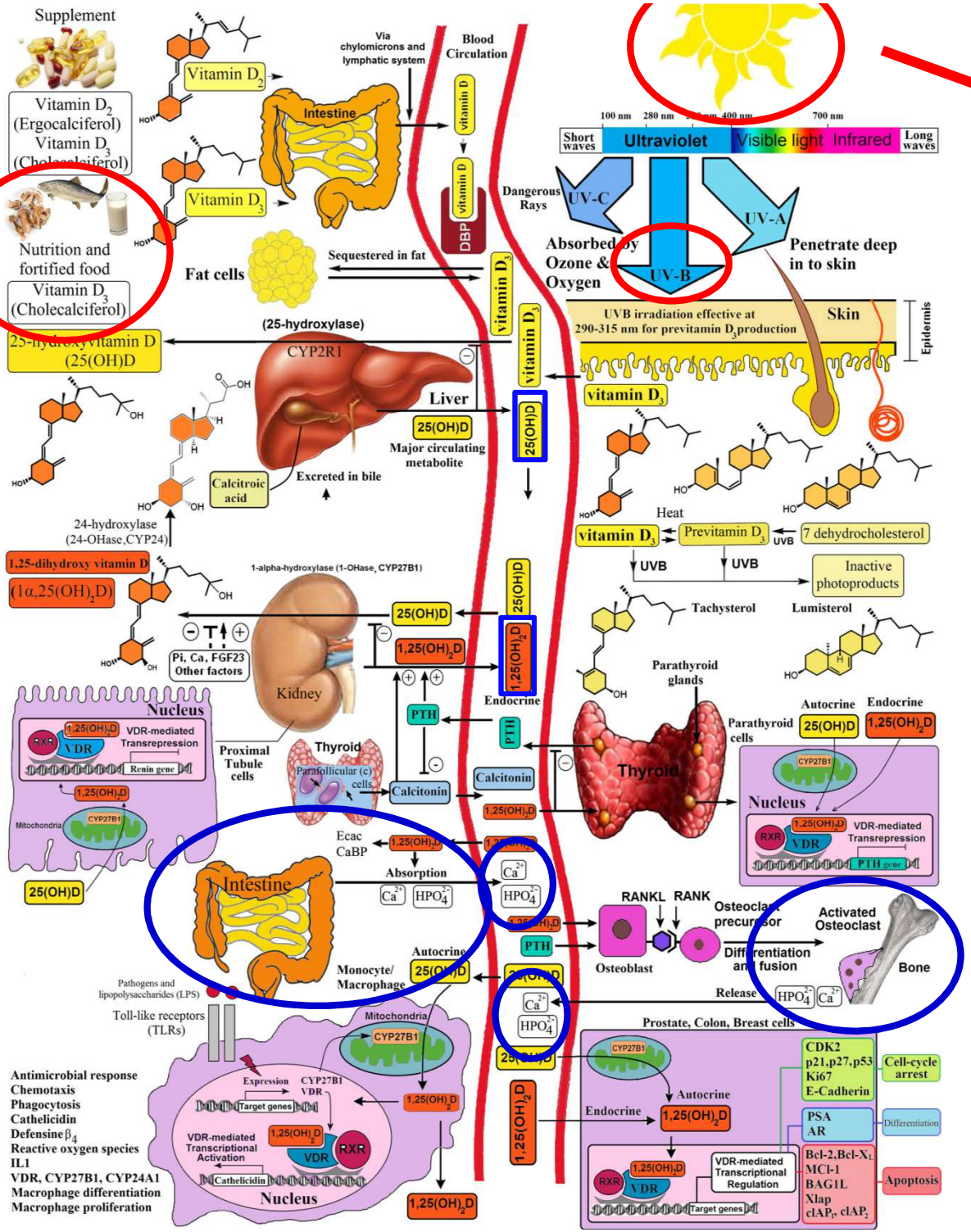


A normal child with good muscle tonus


Cute
7-DHC
Pre-D3
Lumisterolo
Tachisterolo
temp. cutanea
Dieta
(vit. D2 e vit. D3)
VITAMINA D
DBP
Fegato
(25-idrossilasi)
25(OH)D
DBP
Rene
(1-alfa-idrossilasi)
1,25(OH)2D
1,25(OH)2D
Intestino
Osso
Ca - P
Paratiroidi
(PTH)
Ca - P
Mantenimento omeostasi fosfo-calcica
Mineralizzazione ossea

90%

10%



Calcio e fosforo

Calcio e fosforo

(Saggese G, Vierucci F, et al. Eur J Pediatr 2015)

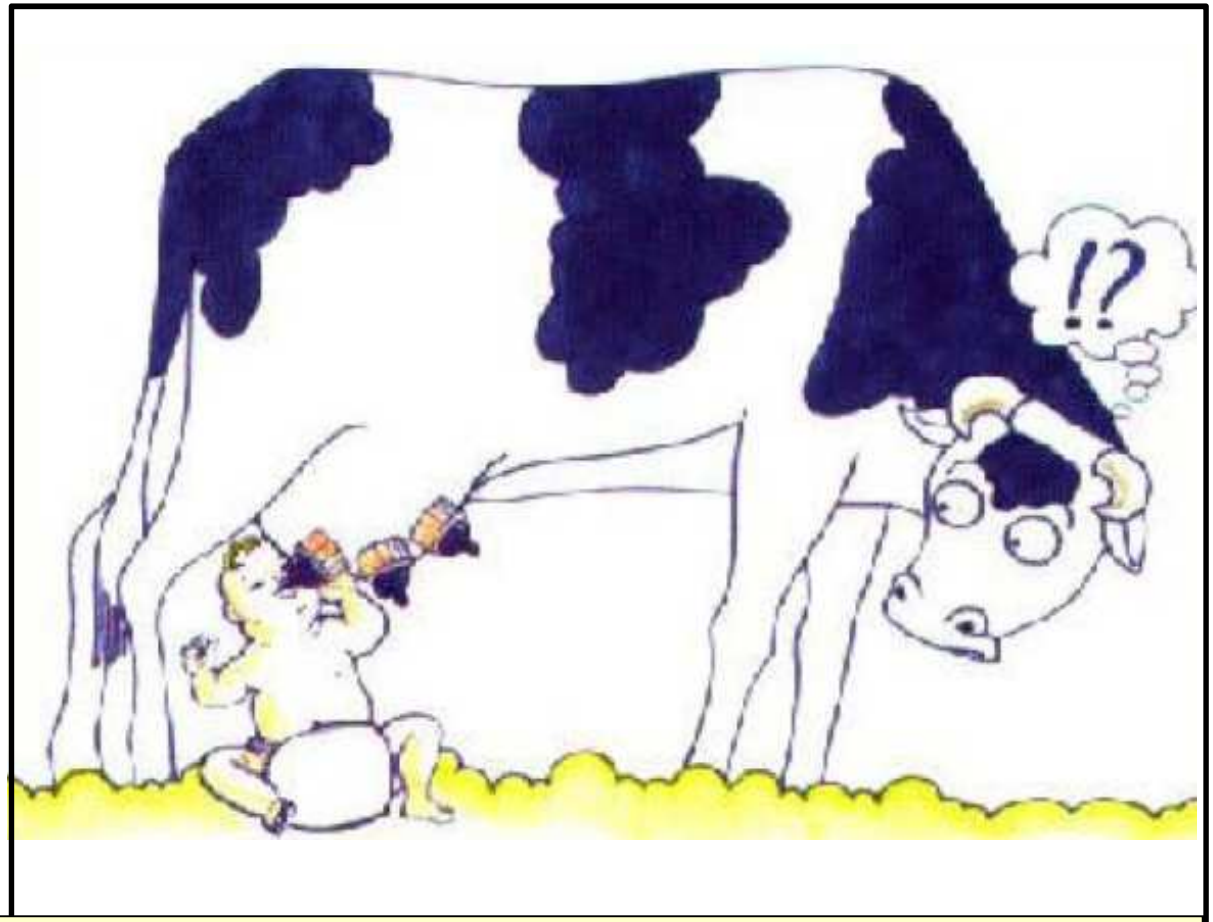
Prima infanzia
(0-2 anni)

Seconda infanzia
(3-5 anni)

Terza infanzia
(6-11/12)

Adolescenza

Vitamin D in pediatric age: Consensus SIP, SIPPS & FIMP

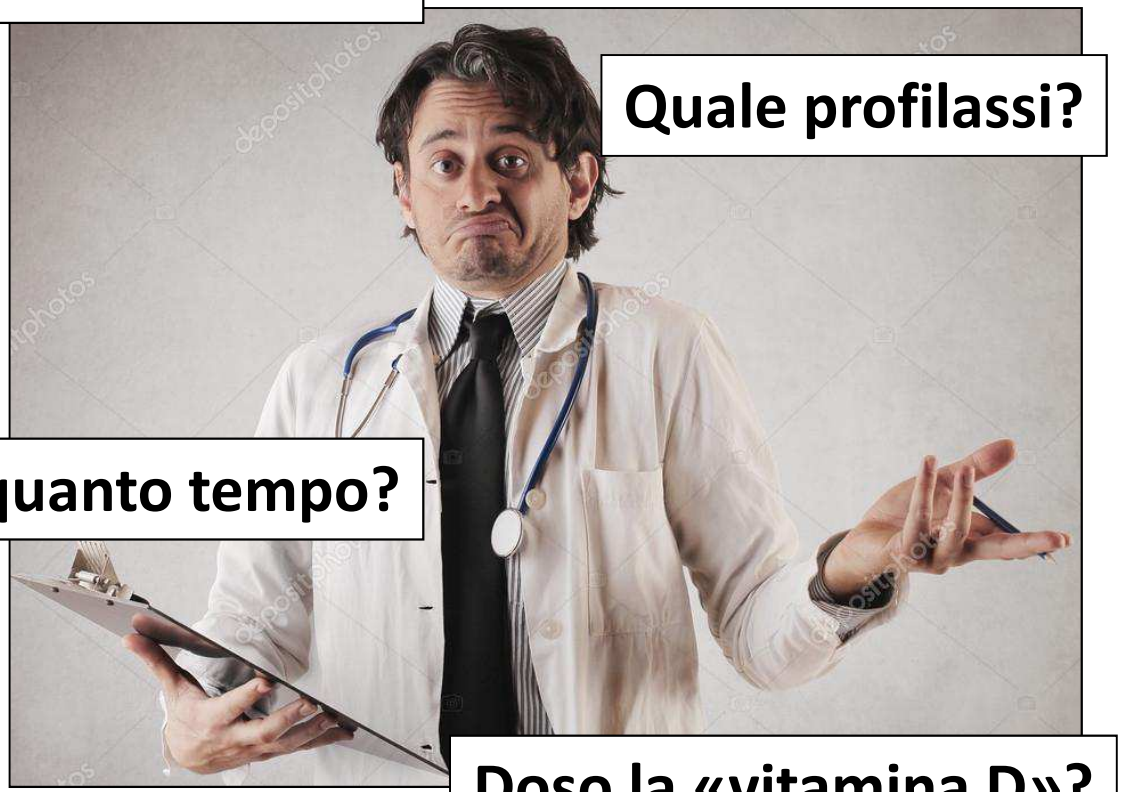


- We recommend vitamin D supplementation in all newborns independently of the type of feeding.
- Vitamin D supplementation should be started within the first days of life and continued throughout the first year.

(Italian Journal of Pediatrics, May 2018)

E dopo il primo anno?

Profilassi?



Quale profilassi?

Per quanto tempo?

Doso la «vitamina D»?

Lo stato vitaminico D durante la seconda e la terza infanzia in Italia

Studio	Periodo di arruolamento	N.	Età (range)	Città/ Regione (latitudine)	Deficit, % [25(OH)D < 20 ng/ml]	Insuff., % [25(OH)D: 20-29 ng/ml]	Ipovit. D, % [25(OH)D < 30 ng/ml]
Vierucci [8]	ott 2010-set 2012	283	2-11 anni	Pisa (43°N)	40,3	35,0	75,3
Franchi [9]	gen 2010-dic 2012	1.148 (caucasici)	0-16 anni	Verona (45°N)	44,2	30,6	74,8
Ciresi [10]	gen 2011-dic 2012	80*	4-16 anni	Sicilia (37°N)	40,0	35,0	75,0
Stagi [11]	set 2010-dic 2013	679	2-18 anni	Firenze (44°N)	58,7	30,0	88,7
Prodam [12]	lug 2009-dic 2013	575°	6-18 anni	Novara (45°N)	46,1	37,6	83,7

** Bambini affetti da deficit di ormone della crescita; ° Soggetti con sovrappeso/obesità.*

«1 bambino su 2 ha un deficit di vitamina D»

(Vierucci F et al. Il Medico Pediatra 2018)

Chi è a rischio di deficit di vitamina D?

Elena, 4 anni

Fabio, 4 anni

Saggese et al. Italian Journal of Pediatrics (2018) 44:51
https://doi.org/10.1186/s13052-018-0488-7

Italian Journal of Pediatrics

REVIEW Open Access

Vitamin D in pediatric age: consensus of the Italian Pediatric Society and the Italian Society of Preventive and Social Pediatrics, jointly with the Italian Federation of Pediatricians

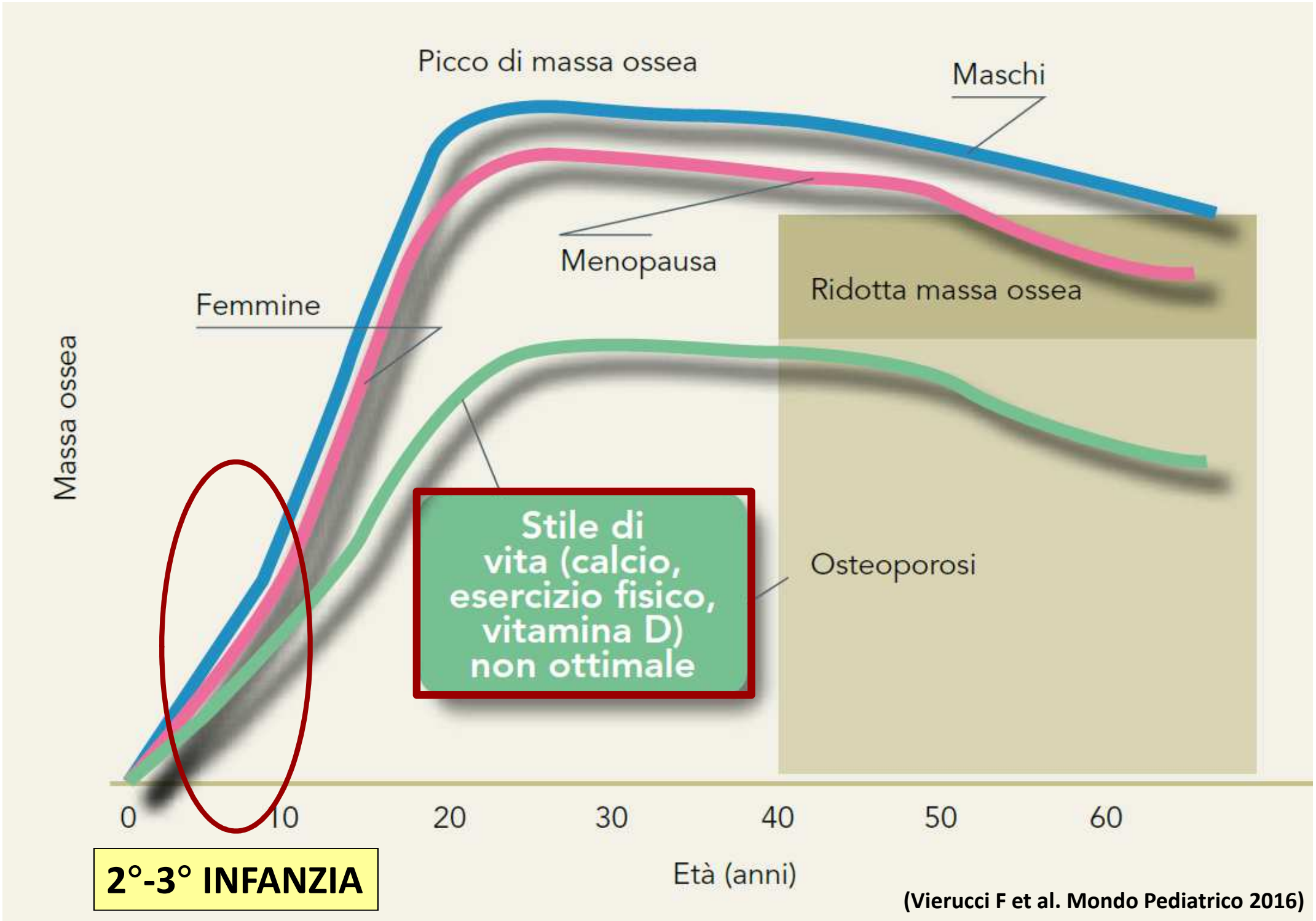
Giuseppe Saggese[1†], Francesco Vierucci[2*†], Flavia Prodam[3], Fabio Cardinale[4], Irene Cetin[5], Elena Chiappini[6], Gian Luigi de' Angelis[7], Maddalena Massari[5], Emanuele Miraglia Del Giudice[8], Michele Miraglia Del Giudice[8], Diego Peroni[1], Luigi Terracciano[9], Rino Agostiniani[10], Domenico Careddu[11], Daniele Giovanni Ghiglioni[12], Gianni Bona[13], Giuseppe Di Mauro[14] and Giovanni Corsello[15]

Caratteri sessuali

Peso

Statura

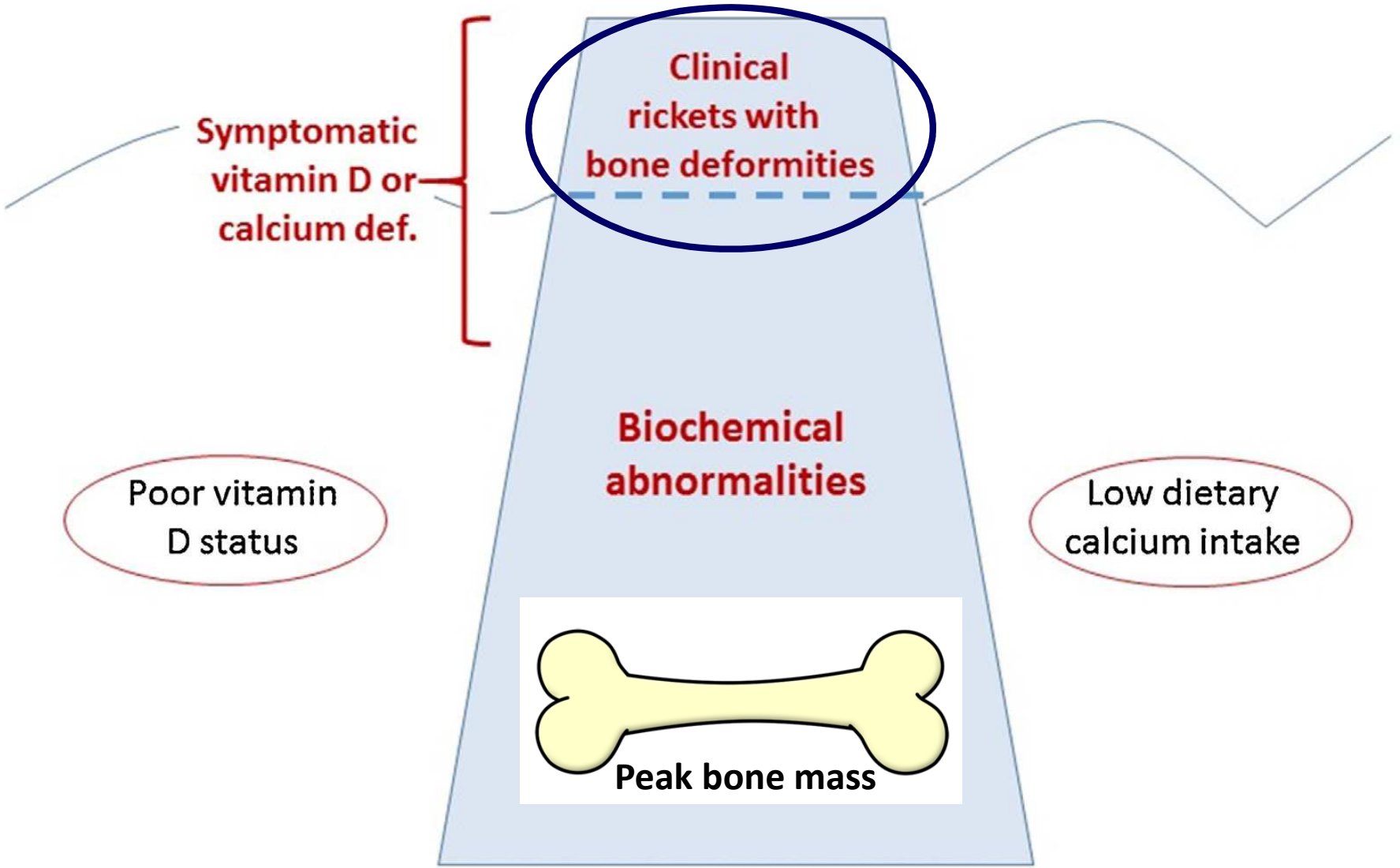
Massa ossea



2°-3° INFANZIA

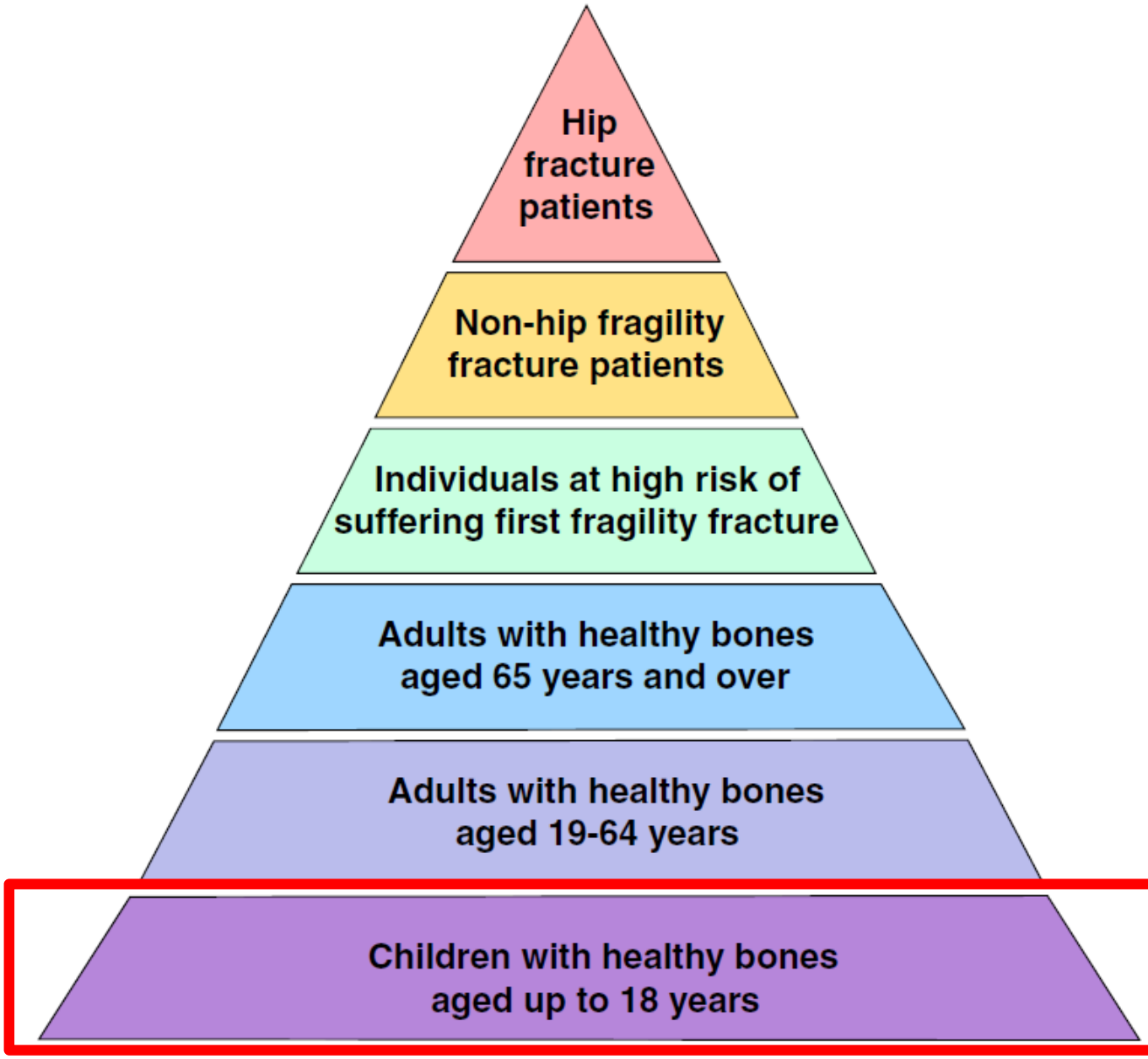
(Vierucci F et al. Mondo Pediatrico 2016)

The tip of the iceberg



(Pettifor. J Steroid Biochem Mol Biol 2015)

National Osteoporosis Foundation systematic approach to fragility fracture care and prevention for the USA



Objective 1: Improve outcomes and efficiency of care after hip fractures by delivering **professional standards** per established performance and quality measures

Objective 2: Respond to the first fracture to prevent the second through establishment of **Fracture Liaison Services** bridging hospital and primary care services for fracture patients

Objective 3: Health insurers or primary care providers to **stratify risk** for their patients using fracture risk assessment tools combined with bone density testing

Objective 4: Consistent delivery of public health messages on preserving physical activity, healthy lifestyles and reducing environmental hazards

Objective 5: Consistent delivery of public health messages on maintaining adequate dietary intake of calcium, ensuring vitamin D sufficiency and the benefits of regular exercise

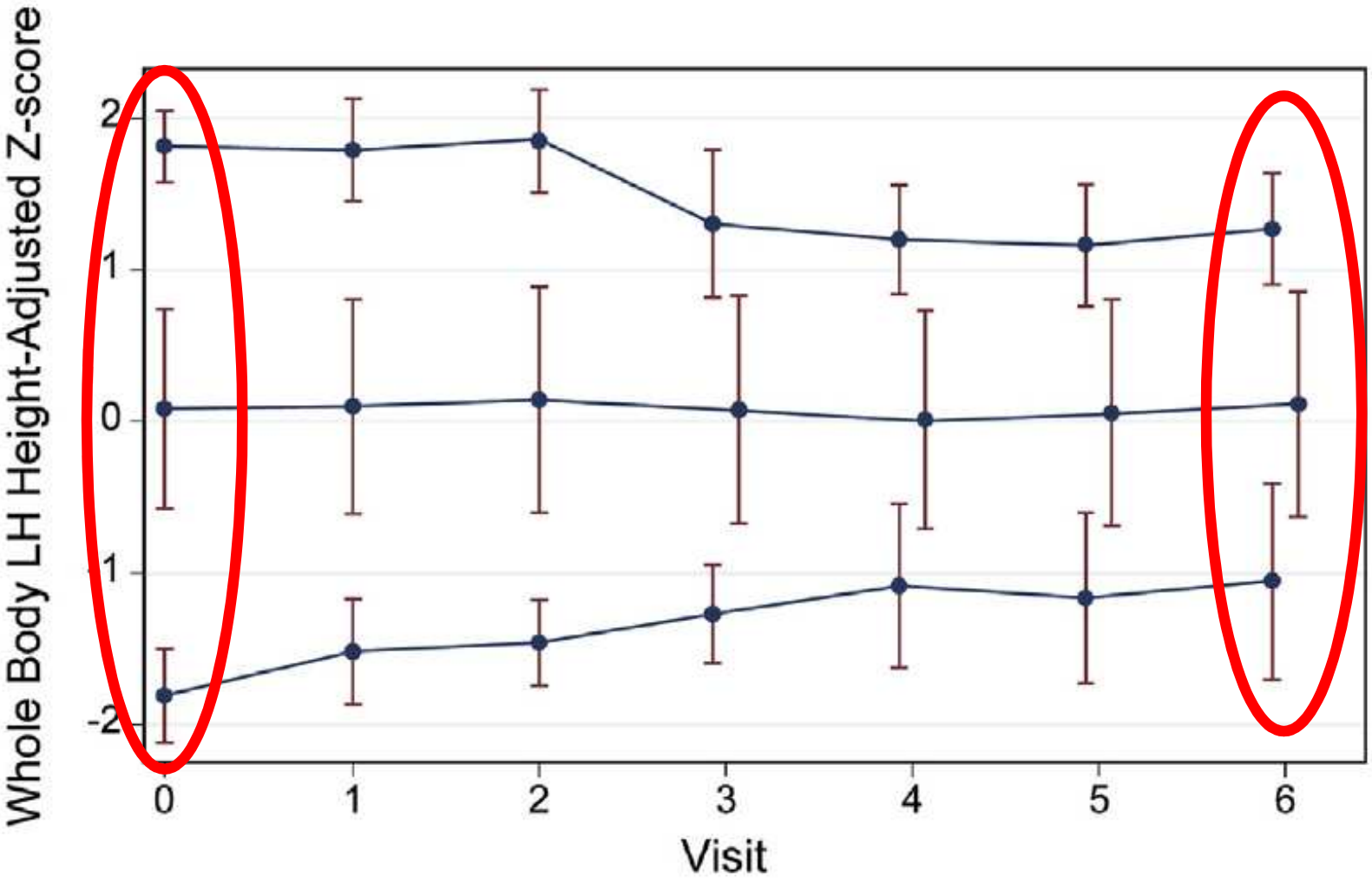
Objective 6: Consistent delivery of public health messages on accrual of Peak Bone Mass through a well-balanced diet and regular exercise which promotes bone development

(Mitchell et al. Osteoporos Int Dec 2015)

Longitudinal tracking of DXA bone measures over 6 years in children and adolescents: persistence of low bone mass to maturity

(240 male and 293 female, age 6-17 years, yearly DXA evaluations for 6 years)

Baseline Z-score
- **< 1.5**
- **-1.5 to 1.5**
- **> 1.5**



p<0.001

Bone status during childhood is a strong predictor of bone status in young adulthood, when peak bone mass is achieved.

(Wren et al. J Pediatr 2014)

The National Osteoporosis Foundation's position statement on peak bone mass development and lifestyle factors: a systematic review and implementation recommendations

Lifestyle Factor	Grade
Macronutrients	
Fat	D
Protein	C
Micronutrients	
Calcium	A
Vitamin D	B
Micronutrients other than calcium and vitamin D	D
Food Patterns	
Dairy	B
Fiber	C
Fruits and vegetables	C
Detriment of cola and caffeinated beverages	C
Infant Nutrition	
Duration of breastfeeding	D
Breastfeeding versus formula feeding	D
Enriched formula feeding	D
Adolescent Special Issues	
Detriment of oral contraceptives	D
Detriment of DMPA injections	B
Detriment of alcohol	D
Detriment of smoking	C
Physical Activity and Exercise	
Effect on bone mass and density	A
Effect on bone structural outcomes	B

Level of evidence:

A: strong **B: moderate**

C: limited **D: inadequate**

- **9 publications from 8 RCTs (tutti citati nella Consensus), 1 prospective study, and 3 cross sectional studies published since 2000, encompassing 2.962 individuals.**
- **4 of the 8 RCTs provide evidence for a beneficial effect of vitamin D supplementation on bone accrual.**
- **Several unanswered questions remain (male sex, critical times during which supplementation may be most effective).**

(Weaver et al. Osteoporos Int 2016; 27:1281-1386)

Bone 116 (2018) 28–

Contents lists available at ScienceDirect

Bone

journal homepage: www.elsevier.com/locate/bone

Full Length Article

Serum 25-hydroxyvitamin D and bone mineral density among children and adolescents in a Northwest Chinese city

S-25OHD is Associated with Hand Grip Strength and Myopathy at Five Years in Girls: An Odense Child Cohort Study

Rada Faris Al-Jwadi, Eva Jespersen, Christine Dalgård, Niels Bilenberg, Henrik Thybo Christesen

The Journal of Clinical Endocrinology & Metabolism
Endocrine Society

Submitted: February 08, 2018

JAMA Pediatrics | Original Investigation

Effect of Higher vs Standard Dosage of Vitamin D_3 Supplementation on Bone Strength and Infection in Healthy Infants
A Randomized Clinical Trial

Serum 25-hydroxyvitamin D and intact parathyroid hormone influences muscle outcomes in children and adolescents†

Abbreviated Title: Vitamin D and muscle outcomes in early adolescents

Journal of Bone and Mineral Research

Journal of Pediatric Gastroenterology and Nutrition, Publish Ahead of Print

DOI : 10.1097/MPG.0000000000002031

VITAMIN D INTERVENTION AND BONE – A RANDOMISED CLINICAL TRIAL IN FAIR AND DARK SKINNED CHILDREN AT NORTHERN LATITUDES

Calcified Tissue International
https://doi.org/10.1007/s00223-018-0466-5

ORIGINAL RESEARCH

Bone Mass Development in Childhood and Its Association with Physical Activity and Vitamin D Levels. The CHAMPS-Study DK

Open Access Protocol

BMJ Open

Does vitamin D supplementation improve bone density in vitamin D-deficient children? Protocol for an individual patient data meta-analysis

Tania Winzenberg,[1,2] Christel Lamberg-Allardt,[3] Ghada El-Hajj Fuleihan,[4] Christian Mølgaard,[5] Kun Zhu,[6,7] Feitong Wu,[1] Richard D Riley[8]

[BMJ Open 2018 Jan 23;8:e019584]

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

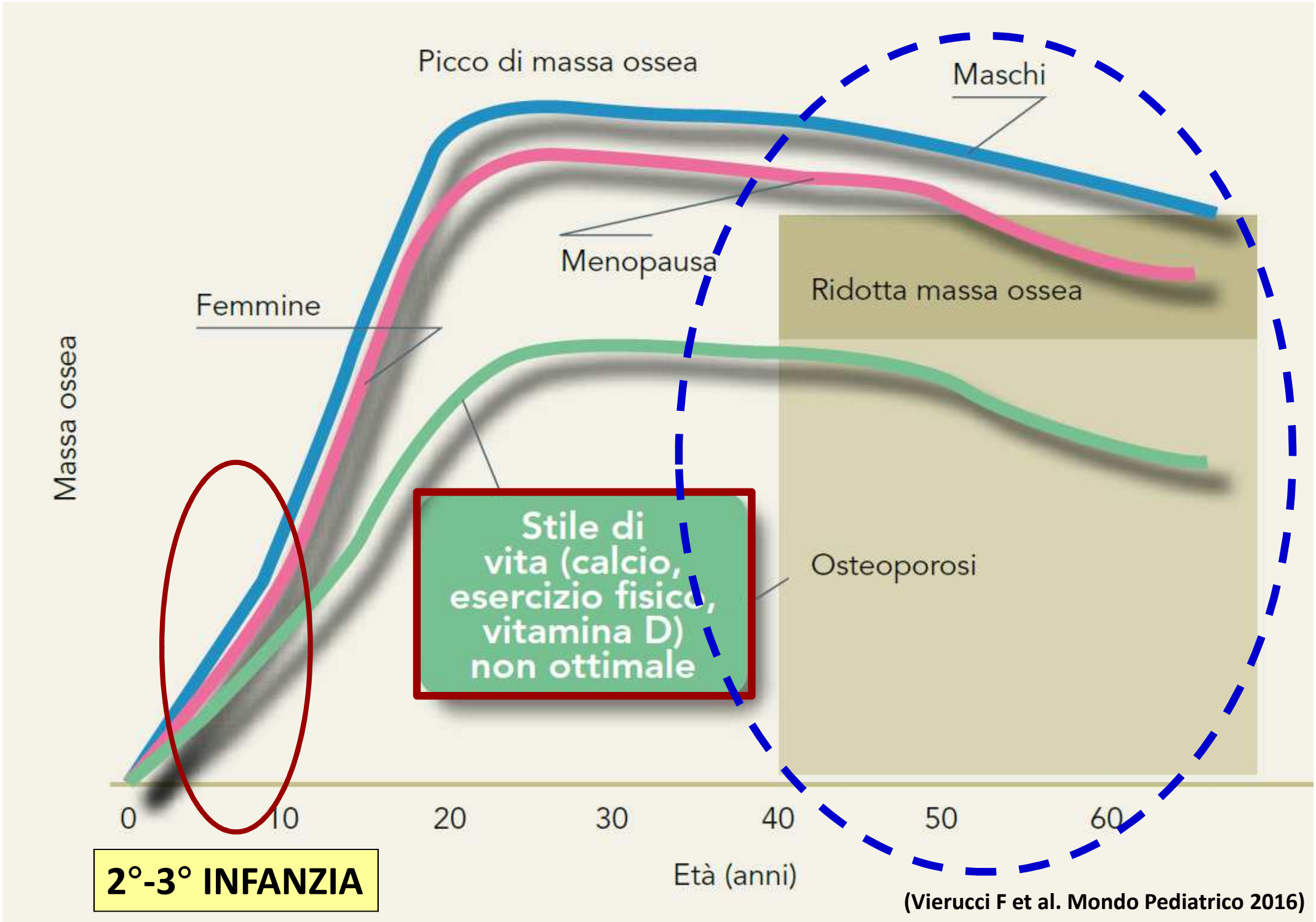
Mark J Bolland, Andrew Grey, Alison Avenell

We assessed RCTs of adults (>18 years) that compared vitamin D with untreated controls, placebo, or lower-dose vitamin D supplements.

Findings We identified 81 randomised controlled trials (n=53 537 participants) that reported fracture (n=42), falls (n=37), or bone mineral density (n=41). In pooled analyses, vitamin D had no effect on total fracture (36 trials; n=44 790, relative risk 1·00, 95% CI 0·93–1·07), hip fracture (20 trials; n=36 655, 1·11, 0·97–1·26), or falls (37 trials; n=34 144, 0·97, 0·93–1·02). Results were similar in randomised controlled trials of high-dose versus low-dose vitamin D and in subgroup analyses of randomised controlled trials using doses greater than 800 IU per day. In pooled

Interpretation Our findings suggest that vitamin D supplementation does not prevent fractures or falls, or have clinically meaningful effects on bone mineral density. There were no differences between the effects of higher and lower doses of vitamin D. There is little justification to use vitamin D supplements to maintain or improve musculoskeletal health. This conclusion should be reflected in clinical guidelines.

(Lancet Diabetes Endocrinol 2018 Oct 4)



(Vierucci F et al. Mondo Pediatrico 2016)

Vitamin D and bone density, fractures, and falls: the end of the story?

There are few studies of severe vitamin D deficiency

JBMR

Journal of Bone and Mineral Research

ASBMR

The American Society for Bone and Mineral Research

Clinical Trial

25-Hydroxyvitamin D Threshold for the Effects of Vitamin D Supplements on Bone Density: Secondary Analysis of a Randomized Controlled Trial

Helen M Macdonald, Ian R Reid, Gregory D Gamble, William D Fraser, Jonathan C Tang, Adrian D Wood

First published: 17 April 2018 | https://doi-org.bibliosan.clas.cineca.it/10.1002/jbmr.3442 | Cite

The Aberdeen study (UK): n = 305 postmenopausal women in late winter

In a study of 400 IU and 1000 IU daily versus placebo, in those with baseline serum **25OHD < 10 ng/ml** there was a significant increase in spine BMD with both 400 IU and 1000 IU daily and in hip BMD with 1000 IU, suggesting that **people with very low serum 25OHD could benefit from treatment.**

The Spectrum of Vitamin D Deficiency

FATTORI DI RISCHIO

STATO VITAMINICO D SUFFICIENTE

DEFICIT VIT. D ASINTOMATICO

DEFICIT VIT. D ASINTOMATICO CON IPERPTH

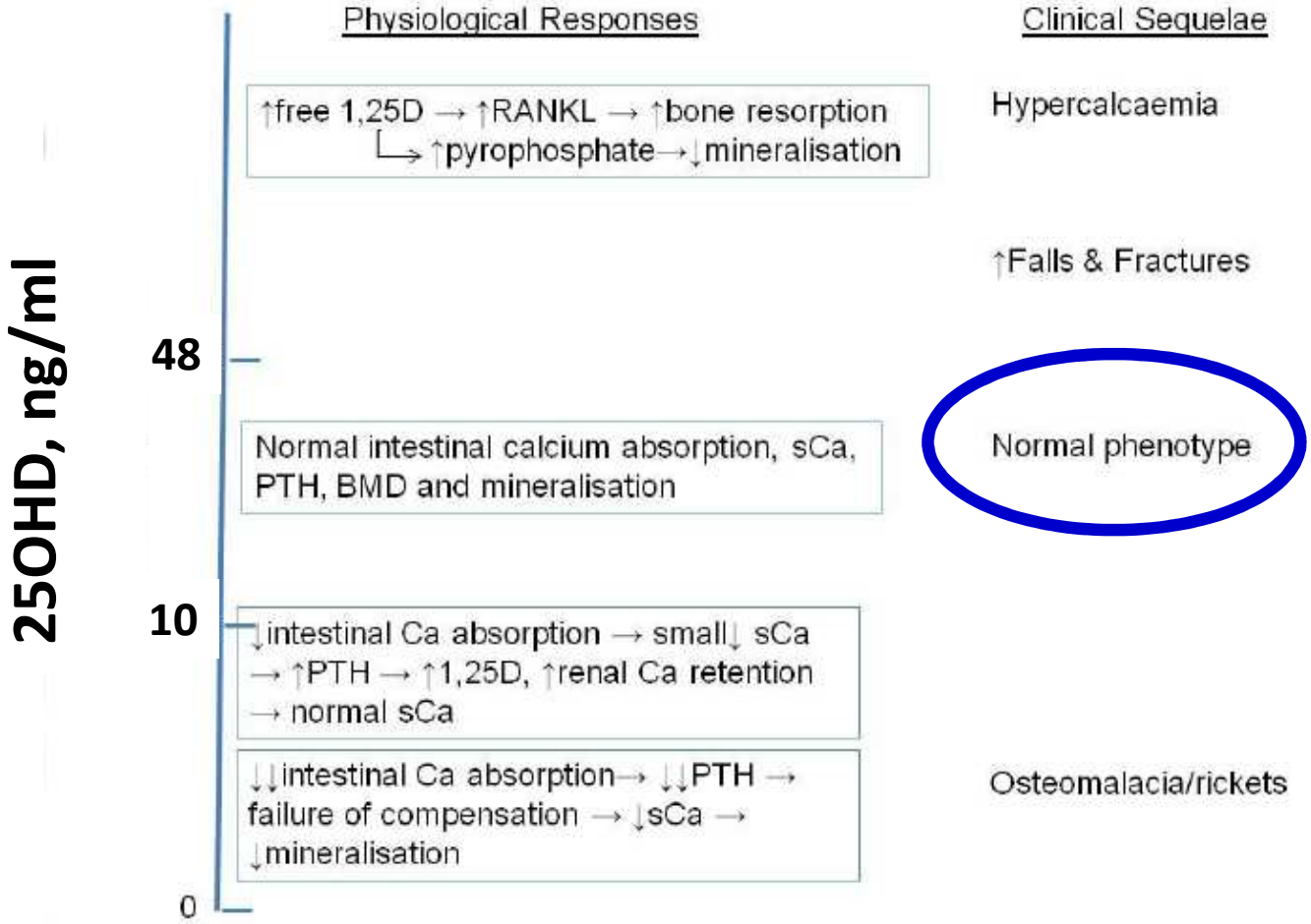
RACHITISMO

DEFICIT VIT. D SINTOMATICO

OSTEOMALACIA

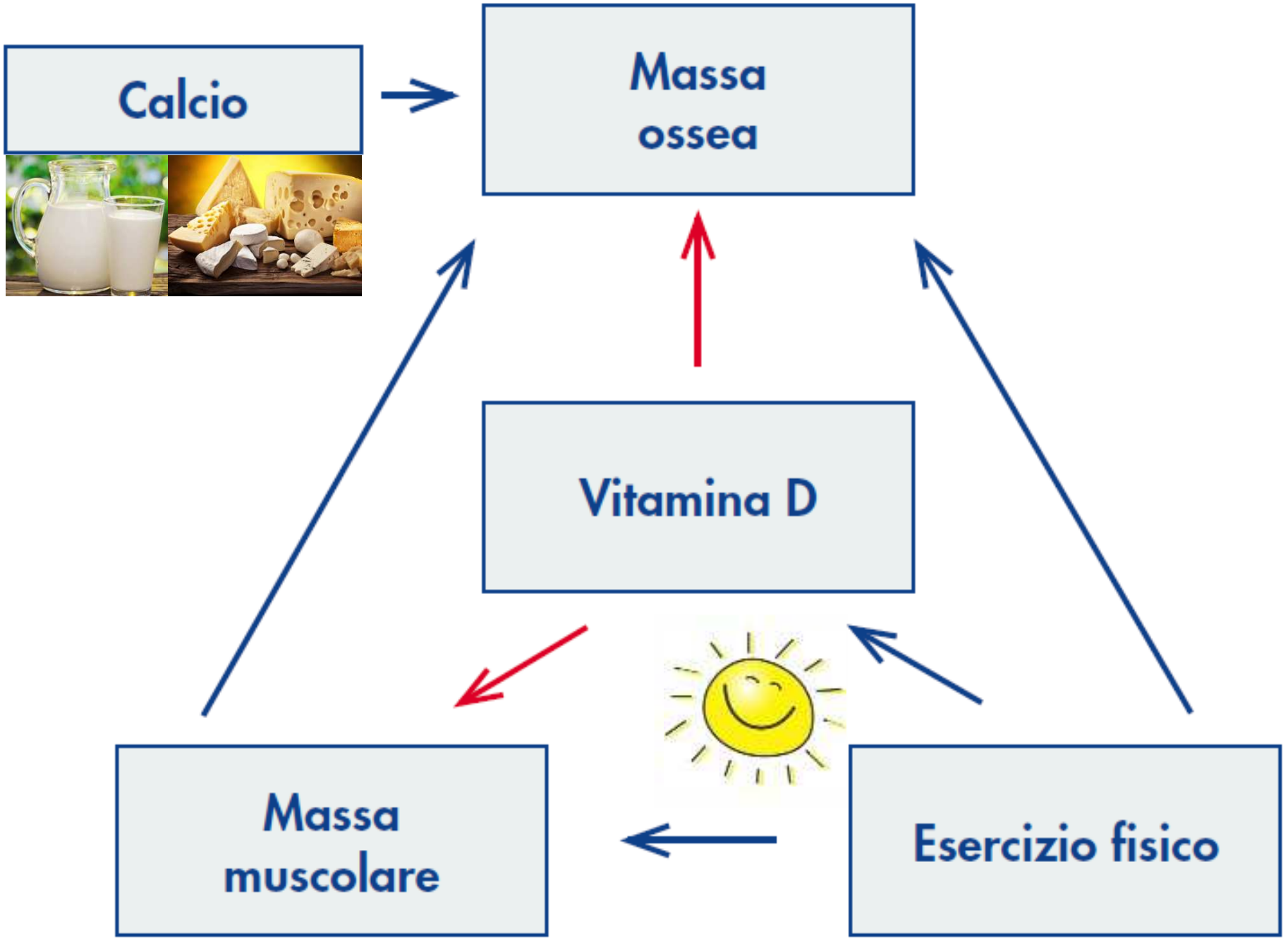
PROFILASSI

(Vierucci F et al. Exp Clin Endocrinol Diabetes 2017 Jul)



(Reid IR, J Intern Med 2018 Sep 19)

- The concentrations of **25OHD** at which the various changes occur vary between studies so indication on the figure are only approximate, and the **y-axis is not linear**.
- **Secondary hyperparathyroidism** is reported when 25OHD is **< 10-16 ng/ml**, and clinical **osteomalacia** is usually only reported when 25OHD is **< 10 ng/ml**.
- The trials which have suggested that vitamin D supplements **increase falls and fractures** have achieved 25OHD concentrations **> 48 ng/ml**.
- **Hypercalcaemia** is generally only found at very much higher 25OHD levels.



(Vierucci F et al. Il Medico Pediatra 2018)


400 UI

Fabbisogno giornaliero raccomandato di vit. D

Primo anno di vita

Adequate intake

Dopo il primo anno di vita

Seconda infanzia

Terza infanzia

Adolescenza

Recommended Dietary Allowance (RDA)

Tabella II. Valori dietetici di riferimento di vitamina D proposti da alcune Società e Organizzazioni internazionali per bambini, adolescenti, donne in gravidanza e donne che allattano (modificato da [6]).

Società/ Organizzazione	Anno	Paese/i	Valori dietetici di riferimento utilizzati	0-12 mesi, UI/die	1-18 anni, UI/die	Donne in gravidanza	Donne che allattano
European Food Safety Authority	2016	Europa	AI	400 (7-11 mesi)	600 (1-17 anni)	600	600
Scientific Advisory Committee on Nutrition	2016	Regno Unito	Safe Intake (< 4 anni) RNI (4-18 anni)	340-400	400	400	400
Nordic Nutrition Recommendations	2012	Danimarca, Finlandia, Islanda, Norvegia, Svezia	RI	400	400	400	400
German Nutrition Society	2012	Germania, Austria, Svizzera	AI	400	800*	800*	800*
Health Council of the Netherlands	2012	Paesi Bassi	AI	400	400	400	400
LARN	2012	Italia	AI (6-12 mesi) PRI (1-18 anni)	400 (6-12 mesi)	600	600	600
Institute of Medicine	2011	Nord America, Canada	AI (< 12 mesi) RDA (1-18 anni)	400	600	600	600
The Endocrine Society	2011	Raccomandazione mondiale	Fabbisogni giornalieri°	400-1.000	600-1.000	1.500-2.000	1.500-2.000

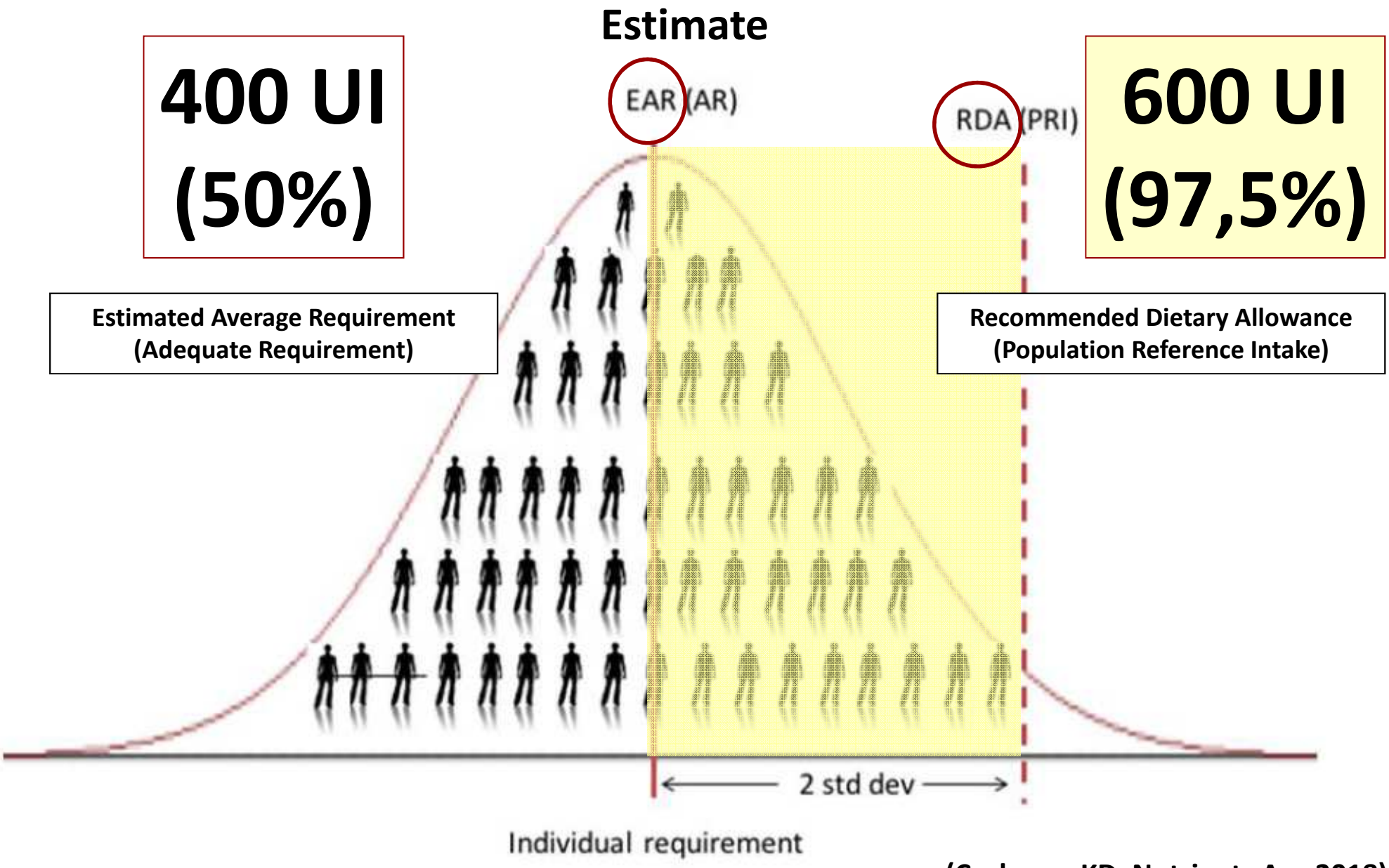
AI: *Adequate Intake*: livello di assunzione di un nutriente che si assume adeguato a soddisfare i fabbisogni della popolazione. Safe Intake: Livello di assunzione di un nutriente che non si associa ad alcun rischio di carenza e al di sotto del quale sono possibili effetti indesiderati.
RNI: *Reference Nutrient Intake*; RI: *Recommended Intake*; PRI: *Population Reference Intake*; RDA: *Recommended Dietary Allowance*: livello di assunzione di un nutriente sufficiente a soddisfare il fabbisogno di quasi tutti (97,5%) i soggetti sani in uno specifico gruppo di popolazione.
* Apporto di vitamina D ritenuto adeguato in caso di assente sintesi cutanea di vitamina D. ° Fabbisogni giornalieri di vitamina D raccomandati nei soggetti a rischio di deficit.

(Vierucci F et al. Quaderni di Medicina e Chirurgia 2017)

Fabbisogno giornaliero raccomandato di vit. D

400 UI (50%)

Estimated Average Requirement (Adequate Requirement)



600 UI (97,5%)

Recommended Dietary Allowance (Population Reference Intake)

(Cashman KD. Nutrients Apr 2018)

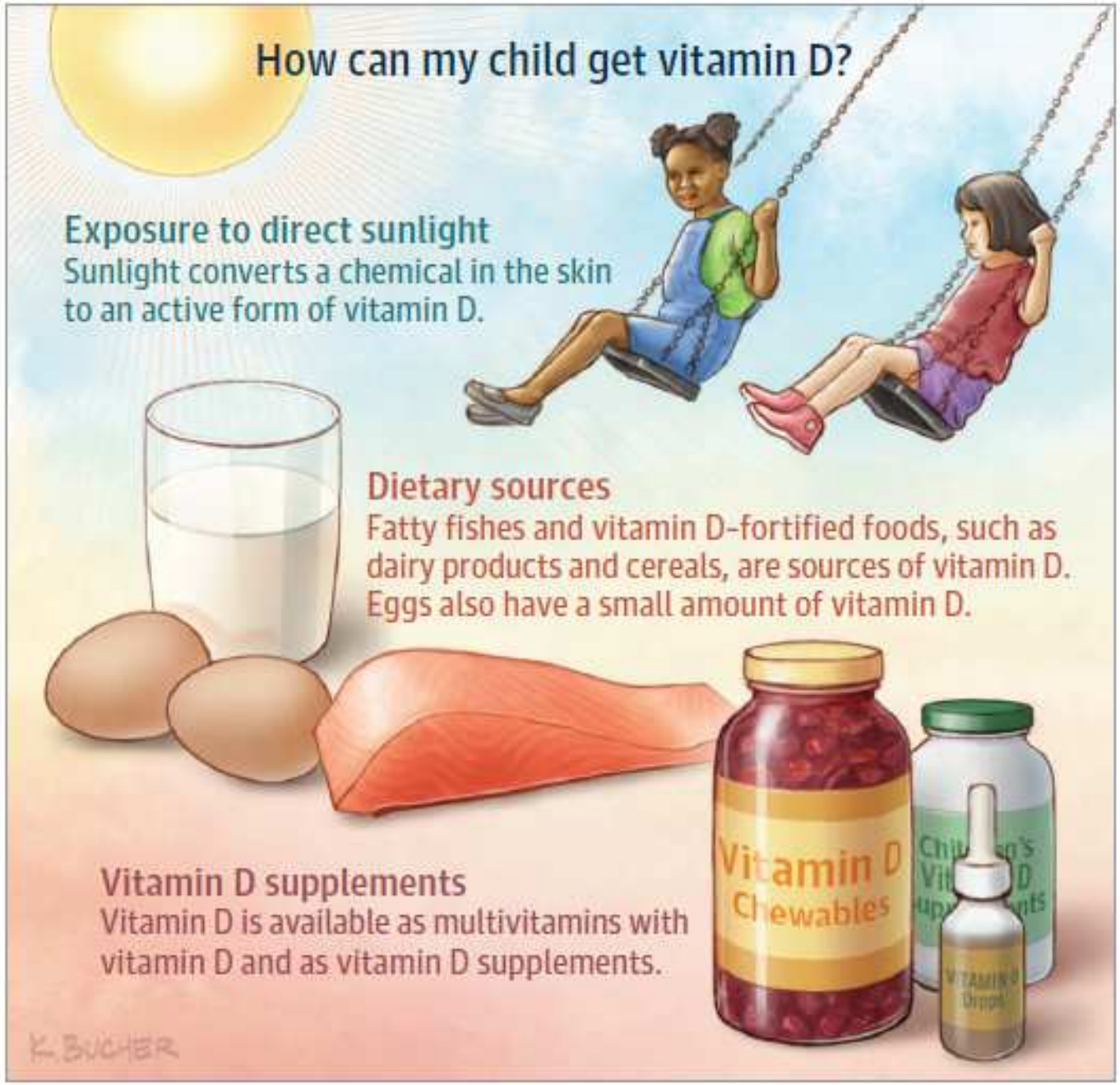
Fattori di rischio di deficit di vitamina D

- RIDOTTA ESPOSIZIONE SOLARE E/O USO COSTANTE DI FILTRI SOLARI
- SOGGETTI DI ETNIA NON CAUCASICA CON ELEVATA PIGMENTAZIONE CUTANEA
- OBESITÀ
- BAMBINI NEL PRIMO ANNO DI VITA NATI DA MADRI CON FATTORI DI RISCHIO DI DEFICIT DI VITAMINA D DURANTE LA GRAVIDANZA NON SOTTOPOSTE A PROFILASSI CON VITAMINA D
- INSUFFICIENZA EPATICA CRONICA
- INSUFFICIENZA RENALE CRONICA
- MALASSORBIMENTO (AD ESEMPIO FIBROSI CISTICA, MALATTIE INFIAMMATORIE CRONICHE INTESTINALI, CELIACHIA ALLA DIAGNOSI, ETC.)
- TERAPIE CRONICHE: ANTIEPILETTICI (FENOBARBITAL, FENITOINA), CORTICOSTEROIDI PER VIA SISTEMICA, FARMACI ANTIRETROVIRALI, ANTIMICOTICI PER VIA SISTEMICA (KETOCONAZOLO)
- FRATTURE RICORRENTI O CONDIZIONI ASSOCIATE A RIDOTTA DENSITÀ MINERALE OSSEA
- IMMOBILIZZAZIONE (PARALISI CEREBRALE, MALATTIE NEUROMUSCOLARI)
- MALATTIE GRANULOMATOSE (AD ESEMPIO TUBERCOLOSI)

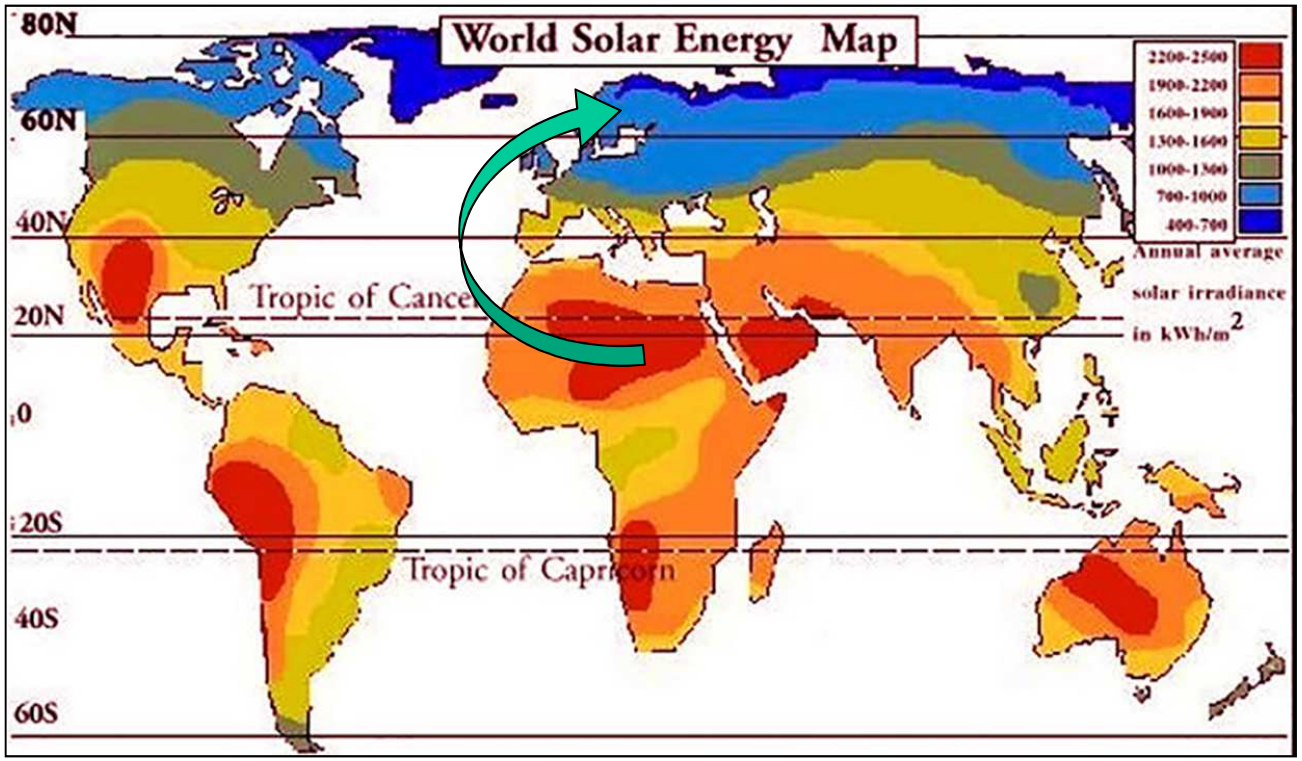
0-12 mesi: 400-1.000 UI/die

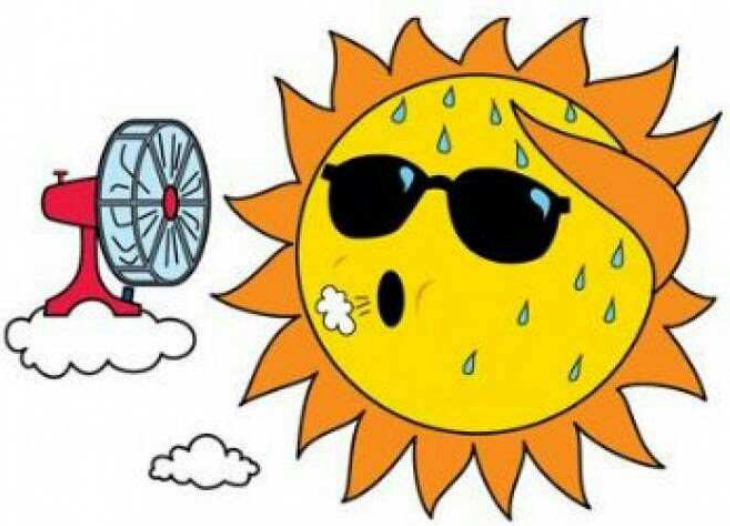
1-18 anni: 600-1.000 UI/die

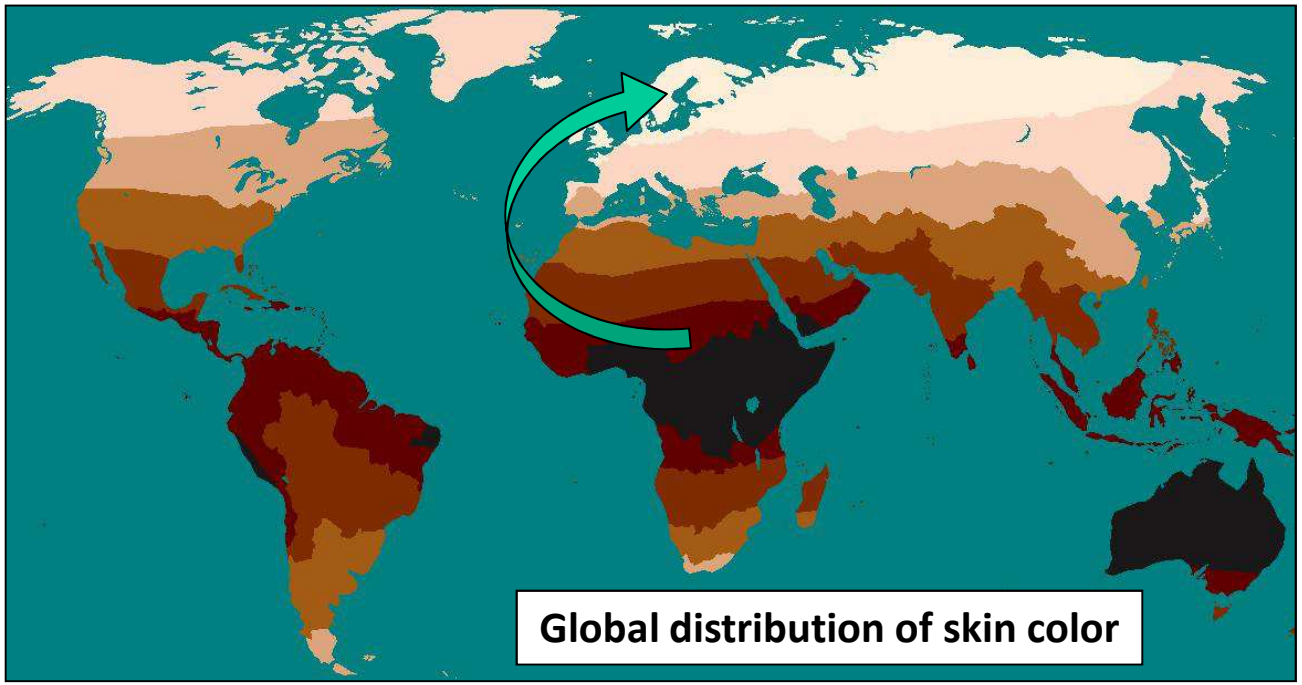
Obesità: 2-3 volte i fabb. per età



(JAMA Pediatrics July 2018)

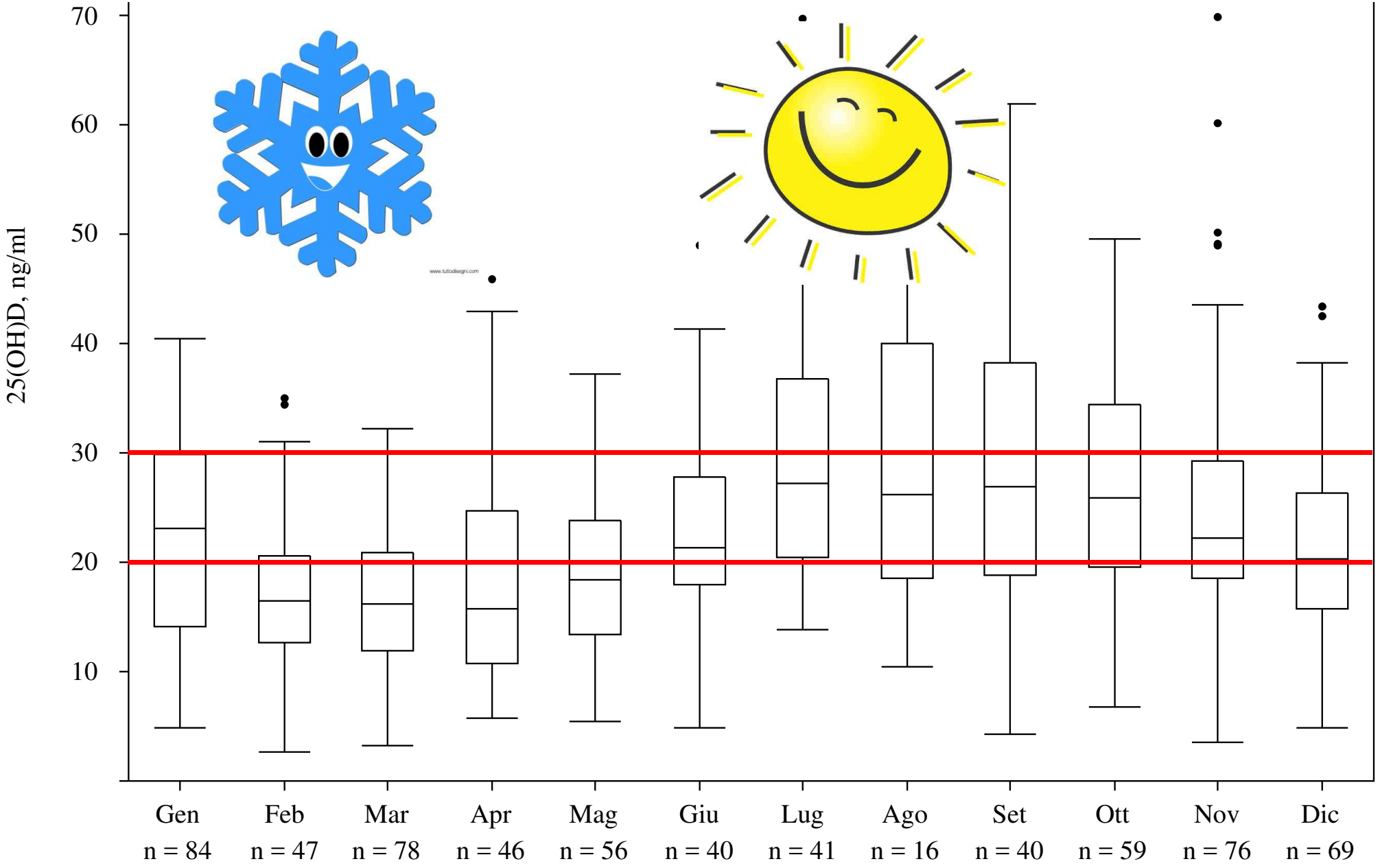






(Hernigou P et al. Int Orthop Mar 2018)

Livelli mediani di 25(OH)D nei diversi mesi dell'anno valutati trasversalmente in 692 bambini e adolescenti toscani (età 2-21 anni) non sottoposti a profilassi con vitamina D (p < 0,0001)

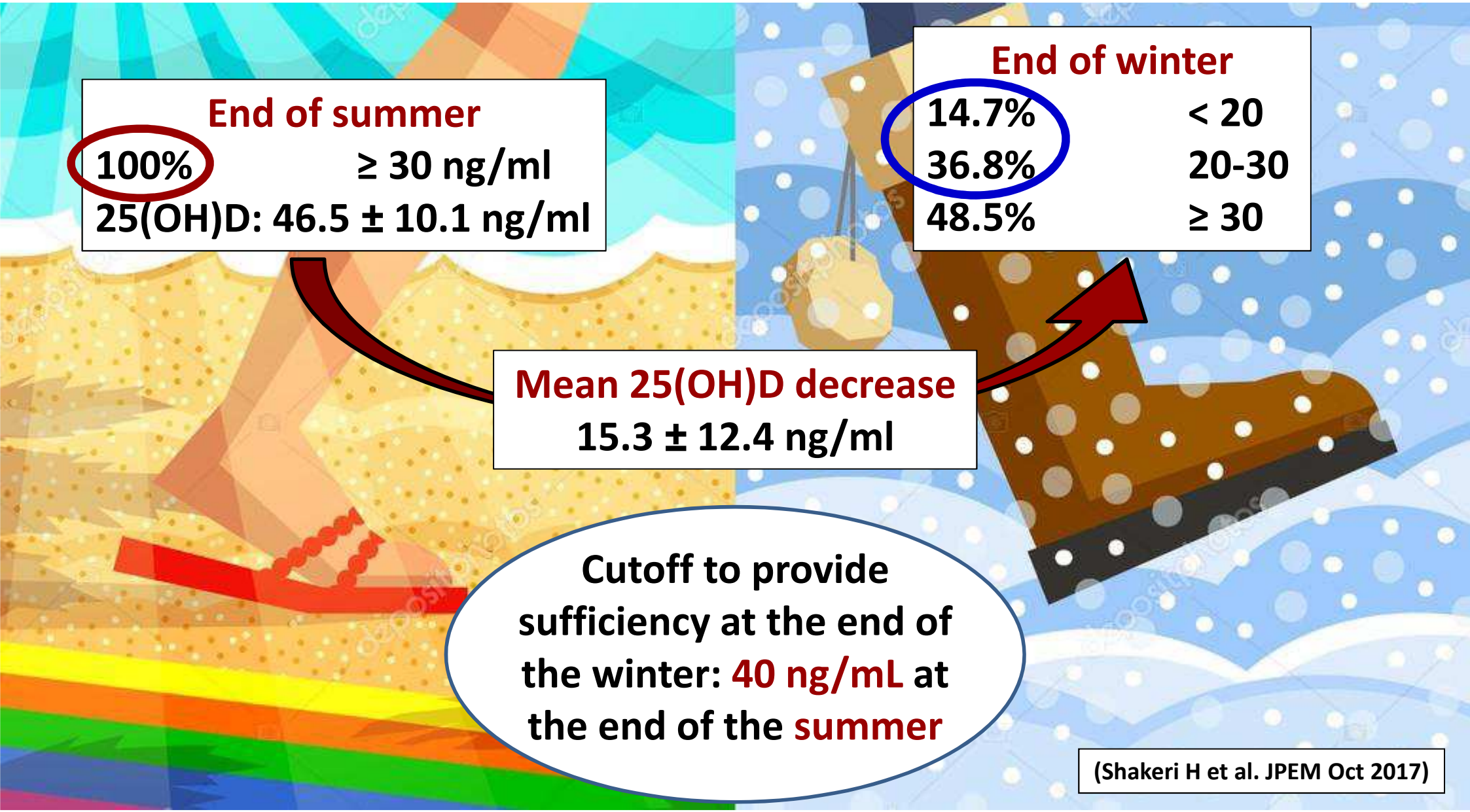


(Vierucci F et al. Eur J Pediatr 2013)

Il deficit di vitamina D oggi

Do sufficient vitamin D levels at the end of summer in children and adolescents provide an assurance of vitamin D sufficiency at the end of winter?

(Iran; Longitudinal study; n = 68; 7-18 years; summer 2011-winter 2012)



UOVO

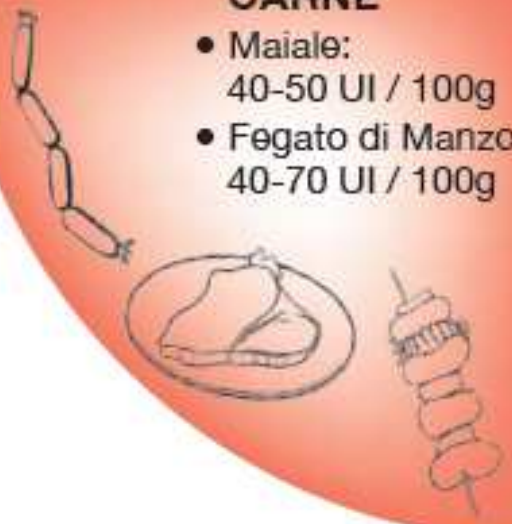
- Tuorlo: 20 UI / 100g

PESCE

- Dentice, Merluzzo, Orata, Palombo, Sogliola, Trota, Salmone, Aringhe: 300 – 1.500 UI / 100g
- Olio di fegato di Merluzzo: 400 UI / 5 ml

CARNE

- Maiale: 40-50 UI / 100g
- Fegato di Manzo: 40-70 UI / 100g



LATTE e LATTICINI

- Latte vaccino o di capra: 5-40 UI / l
- Burro: 30 UI / 100g
- Yogurt: 2,4 UI / 100g
- Panna: 30 UI / 100g
- Formaggio: 12-40 UI / 100g

Con Calcio + Vit B_2 B_{12} D_2

con calcio, fosforo, vit. D e K

VALORI MEDI PER 100 ML	
ENERGIA	
kJ	175
kcal	41
GRASSI	1,0 g
di cui acidi grassi saturi	0,7 g
CARBOIDRATI	4,9 g
di cui zuccheri	4,9 g
FIBRE	0,0 g
PROTEINE	3,2 g
VITAMINE	
Vitamina D	1 µg
MINERALI	
Calcio	160 mg
Fosforo	115 mg
Sodio	0,13 g

Dichiarazione Nutrizionale per 100g		
Energia	374 kJ 88 kcal	
Grassi	0,9	g
di cui:		
acidi grassi saturi		
acidi grassi monoinsatu		
acidi grassi polinsaturi		
Carboidrati		
di cui: zuccheri	16	g
Fibre	0,7	g
Proteine	2,7	g
Sale	0,13	g
Calcio	120 (*)	mg
Riboflavina (Vit B_2)	0,21 (*)	mg
Vitamina B_{12}	0,38 (*)	µg
Vitamina D	1,5 (**)	µg

(*) 15%-(**) 30% dell'Assunzione di Riferimento Giornaliera

1 budino (115 gr): 69 UI vit. D2

1 bicchiere di latte (200 ml): 80 UI vit. D

Consensus SIPPS 2018: dopo il primo anno

- We recommend vitamin D supplementation in children and adolescents with **risk factors for vitamin D deficiency**.

A CHI

- We recommend **daily** vitamin D supplementation ranging from **600** IU/day (i.e. in presence of reduced sun exposure) up to **1000** IU/day (i.e. in presence of multiple risk factors for vitamin D deficiency).
- In cases of poor compliance, supplementation with **intermittent** dosing (**weekly** or **monthly** doses for a cumulative monthly dose of **18000–30000 IU** of vitamin D) can be considered, starting from children aged **5–6 years** and particularly during **adolescence**.

COME

- We suggest vitamin D supplementation from the end of fall to the beginning of spring (**Nov–Apr**) in children and adolescents with **reduced sun exposure** during summer.
- We suggest **continuous** vitamin D supplementation in cases of **permanent risk factors** for vitamin D deficiency.

PER QUANTO

(Italian Journal of Pediatrics 2018)

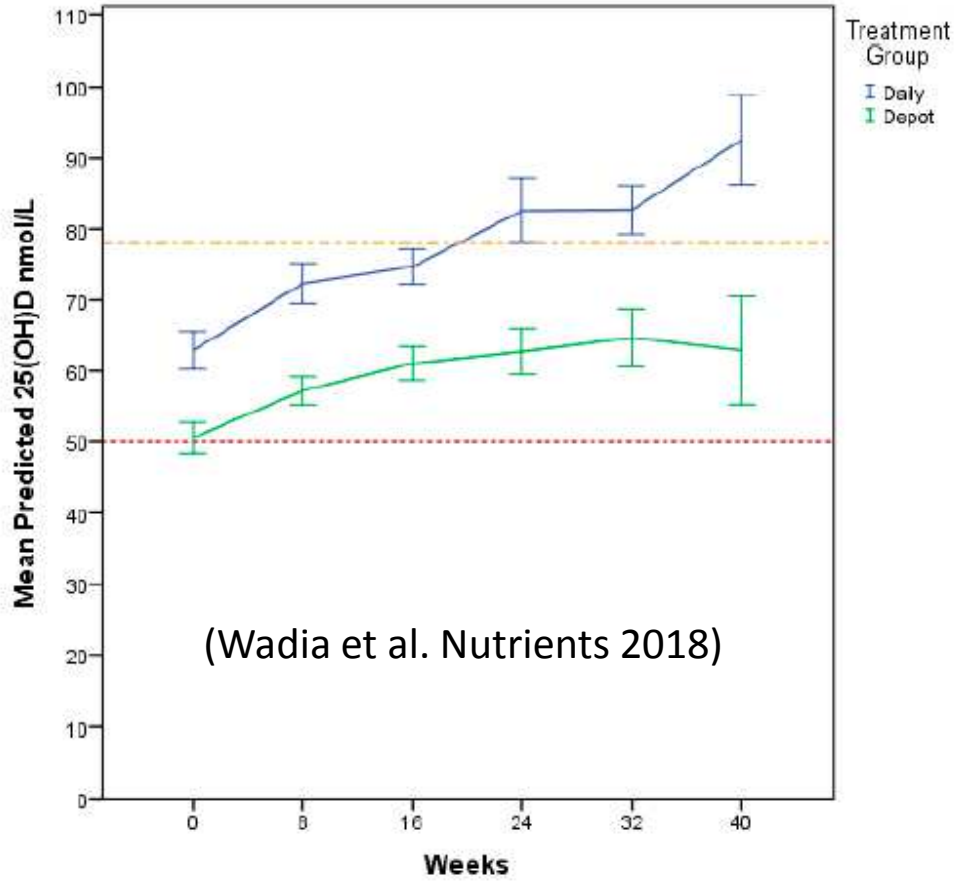
Somministrazione giornaliera o intermittente?

Giornaliera

- Più studi disponibili
- Primo anno di vita
- Minor rischio di «errore»
- Livelli circolanti di 25(OH)D più «stabili»
- Minor dose totale richiesta
- Azioni extrascheletriche?

Intermittente

- Settimanale-bisettimanale-mensile
- Scarsa compliance con somm. giornaliera
- Dopo il 5°-6° anno di vita
- Non somministrare boli > 300.000 UI



(Wadia et al. Nutrients 2018)

Trattamento deficit

300.000 UI/6 sett vs. 84.000 UI/6 sett.

Age	Preparation and Dose[a]		
Infants, 0–12 mo	Vitamin D_2 or D_3 50 000 IU weekly for 6 wk	or	Vitamin D_2 or D_3 2000 IU daily for 6 wk
	Followed by a maintenance dose of 400–1000 IU daily		
Children and adolescents, 1–18 y	Vitamin D_2 or D_3 50 000 IU weekly for 6-8 wk	or	Vitamin D_2 or D_3 2000 IU daily for 6–8 wk
	Followed by a maintenance dose of 600–1000 IU daily		

Vitamin D_2, ergocalciferol; vitamin D_3, cholecalciferol.
[a] Vitamin D_3 may be more potent than vitamin D_2.

(Golden et al. Pediatrics 2014)

400.000 UI/6 sett vs. 112.000 UI/8 sett.

Vitamin D vs. metabolites

	Cholecalciferol	Calcidiol	Calcitriol
Hydroxylation	No	25	1,25
Properties	Lipophilic	Hydrophilic*	Hydrophilic
Circulating half-life	2 days	2-3 weeks	12 hours
Tissue distribution	Adipose/Muscle	Blood/Adipose/Muscle	Blood/Tissues
VDR** activation	?	-/+	++
↑ in serum 25(OH)D levels	+	+	-

* Relatively lipophilic too

** Vitamin D Receptor

*** Cholecalciferol 1 mcg = 40 IU

(Courtesy of Prof. Sandro Giannini)

Choosing Wisely®

An initiative of the ABIM Foundation

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

Section on Endocrinology

Five Things Physicians and Patients Should Question

Avoid ordering Vitamin D concentrations routinely in otherwise healthy children, including children who are overweight or obese.

Although a 25-hydroxyvitamin D concentration, reflecting both vitamin D synthesis and intake, is the correct screening lab to monitor for vitamin D deficiency, current evidence is not sufficient to suggest that screening in otherwise healthy including children who are overweight or obese is necessary or safe.

(October 2, 2017)

Vitamin D in pediatric age: consensus of the Italian pediatric society and the Italian Society of Preventive and Social Pediatrics, jointly with the Italian Federation of Pediatricians

We recommend against routine 25(OH)D testing in children and adolescents. We suggest to measure serum 25(OH)D levels in presence of multiple risk factors for vitamin D deficiency. Vitamin D status should be monitored at least yearly in subjects that require supplementation during the whole year because affected from pathological conditions or receiving drugs affecting vitamin D metabolism

(May 8, 2018)

Quando dosare la vitamina D?

- Sospetto deficit sintomatico/rachitismo carenziale
- Sospetto deficit grave di vit. D (fattori di rischio multipli) tale da richiedere trattamento
- Sospetta patologia del metabolismo calcio-fosforo (es. “osteoporosi”)
- Patologie croniche e/o farmaci interferenti con il metabolismo della vit. D

Casi particolari (da individualizzare)

- Asma grave, steroido-resistente (prevenzione esacerbazioni)
- Infezioni respiratorie ricorrenti (prevenzione)

+ Sospetto deficit di vit. D

Quando NON dosare la vitamina D?

- Nel bambino “altrimenti sano”
- Nel bambino con scarsa esposizione alla luce solare
- Nel bambino di colore “altrimenti sano”
- Nel bambino obeso “altrimenti sano”

Stile di vita

PROFILASSI


PREVENTION
IS BETTER
THAN CURE

JAMA PEDIATRICS PATIENT PAGE

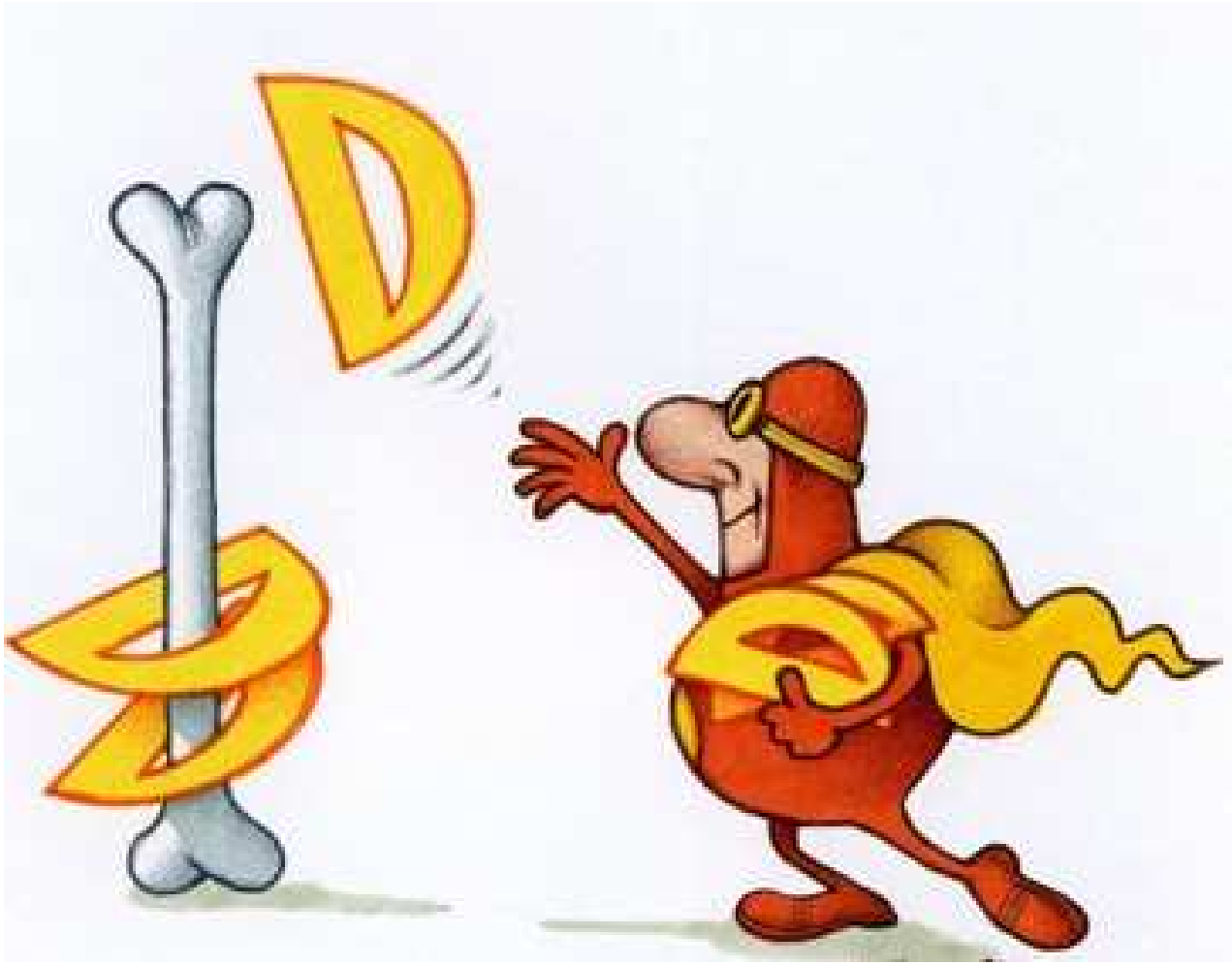
Vitamin D and Your Child

Vitamin D is essential for building and maintaining healthy bones. While many know that calcium is a primary component of bone growth and development, not everyone knows that calcium can only be absorbed by your body when vitamin D is present.

- **While daily multivitamins are not recommended as necessary for children, supplementing with vitamin D may be helpful for those not getting their daily vitamin D allowance through foods or who have limited sun exposure.**
- **If you are unsure if your child is getting enough vitamin D, talk with your pediatrician.**

(JAMA Pediatrics July 2018)

KEEP
CALM
GET YOUR
VITAMIN D
ON



Grazie per l'attenzione