L’identificazione e la gestione della persona a rischio di frattura

S. Gonnelli

Dipartimento di Scienze Mediche, Chirurgiche e Neuroscienze

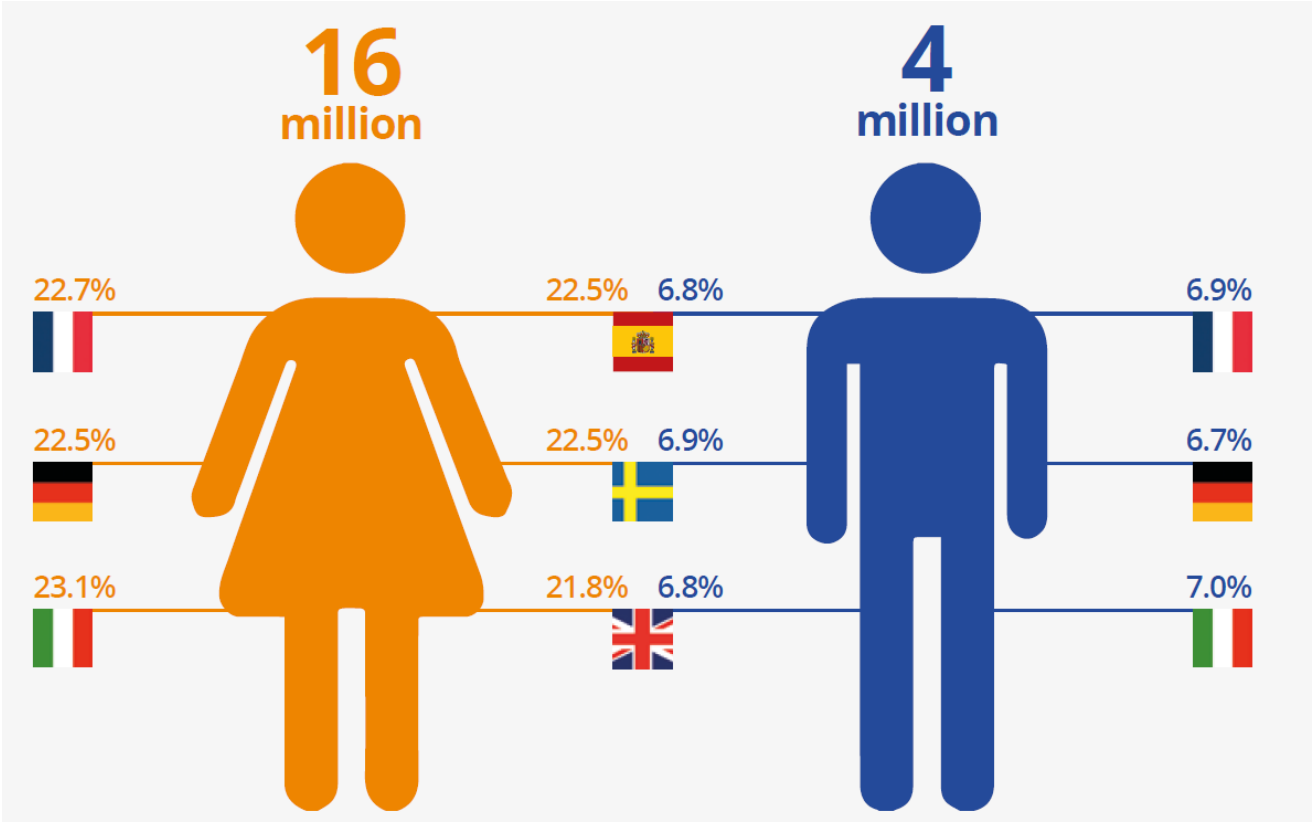
Università degli Studi di Siena

BROKEN BONES, BROKEN LIVES:

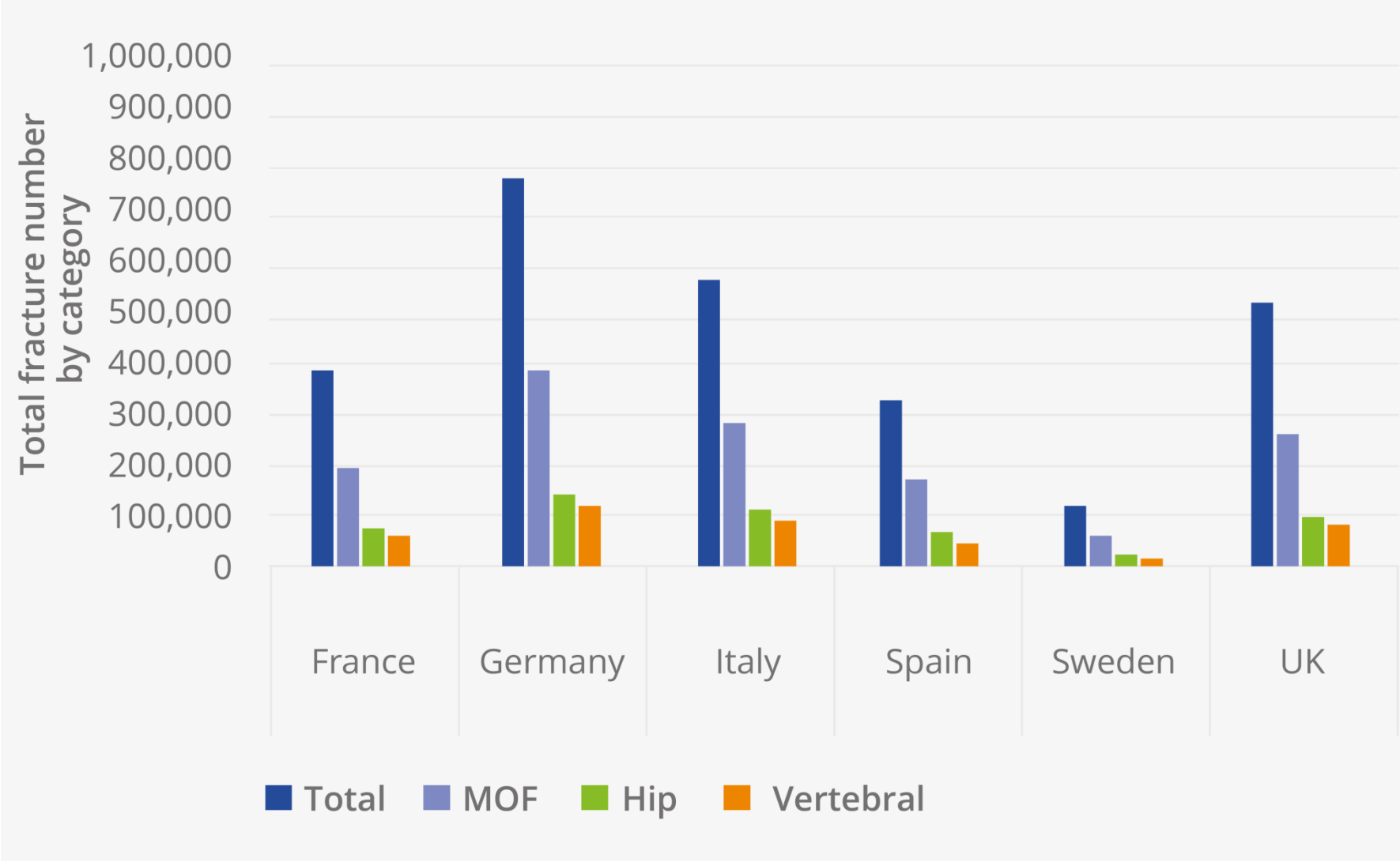
A roadmap to solve the fragility fracture crisis in Italy

IOF
International
Osteoporosis
Foundation

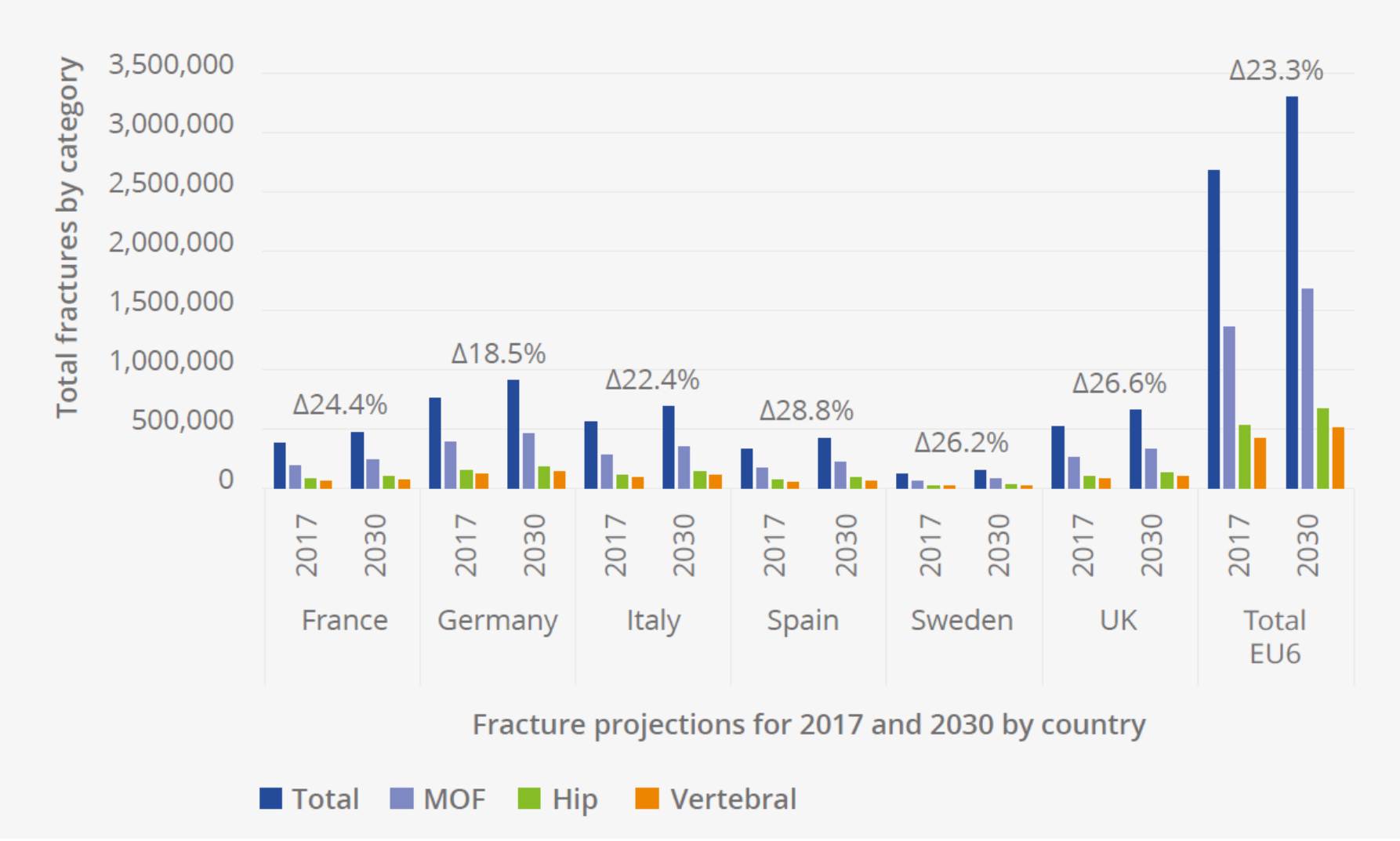
Prevalence of osteoporosis across the EU6



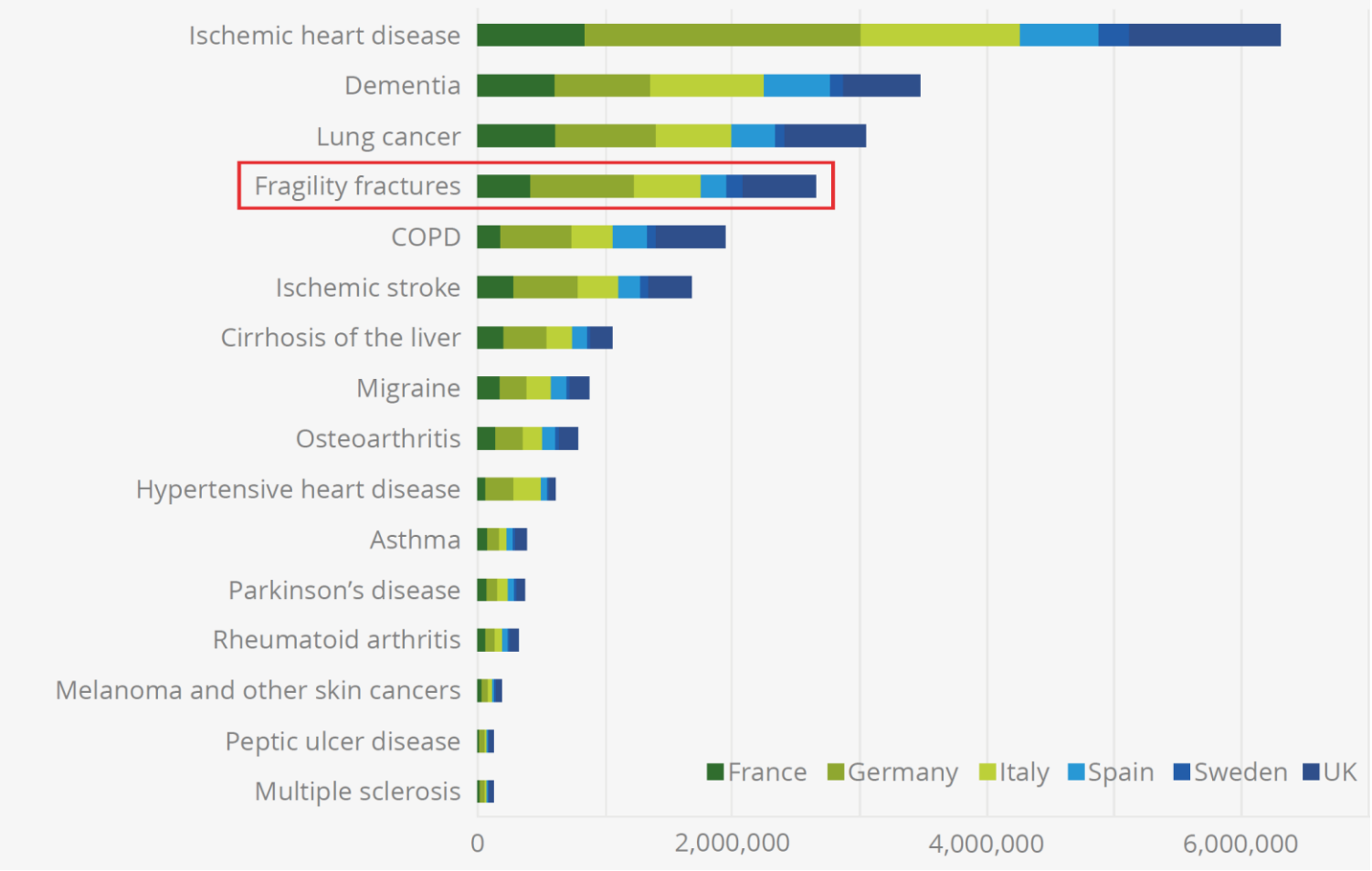
Estimated number of fragility fractures by fracture category and country in 2017



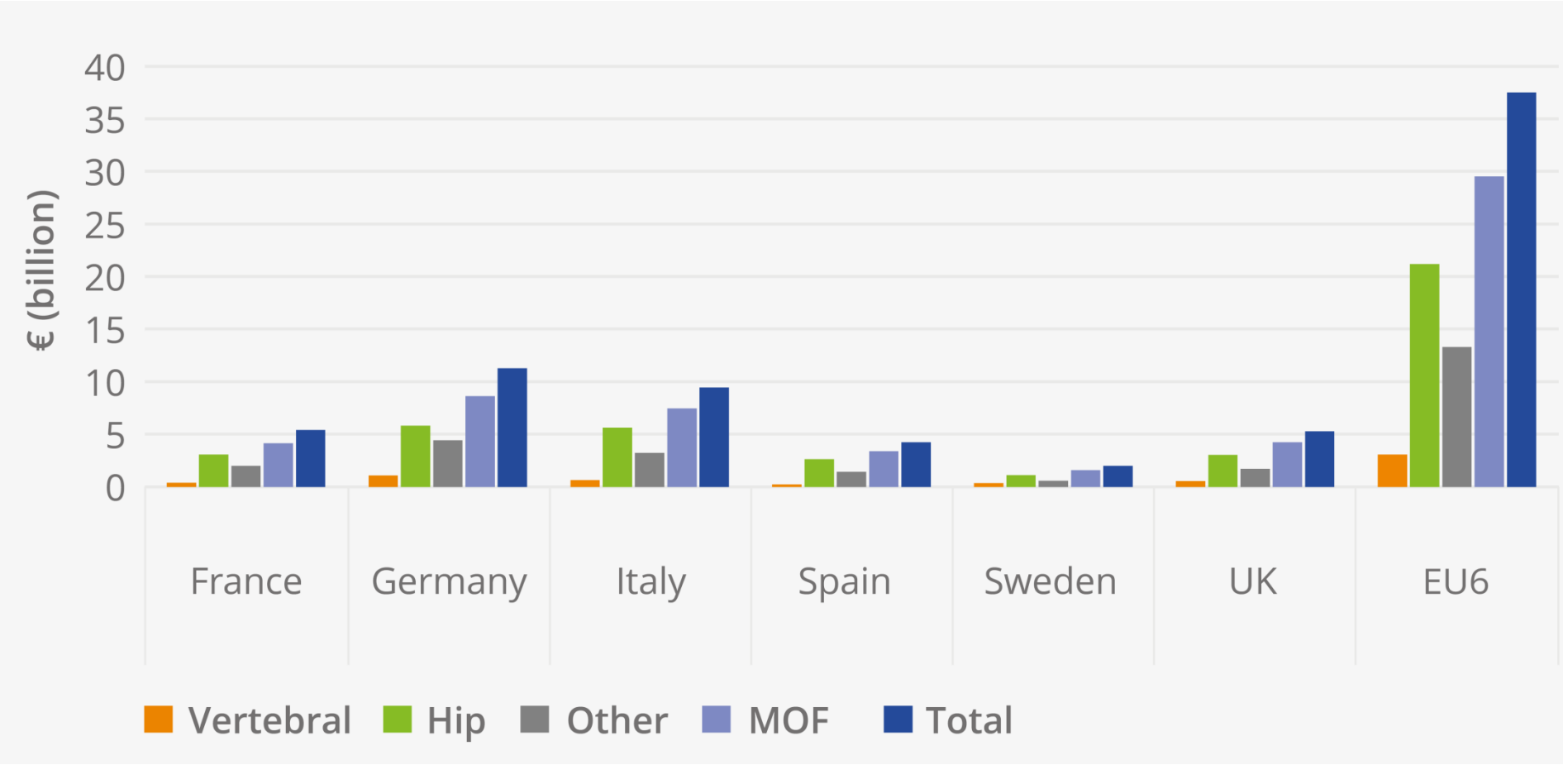
Estimated number of fragility fractures by fracture category and country in 2017 and 2030, including percentage change for all fragility fractures



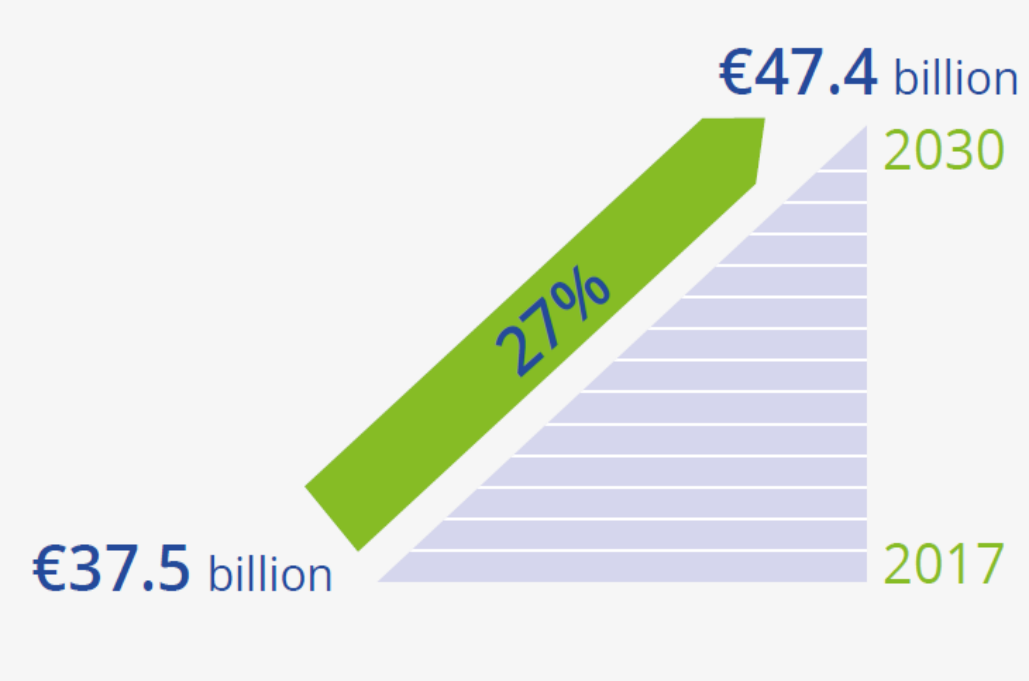
Country contribution to total disability-adjusted life years (DALYs) by disease in the EU6 in 17 selected diseases

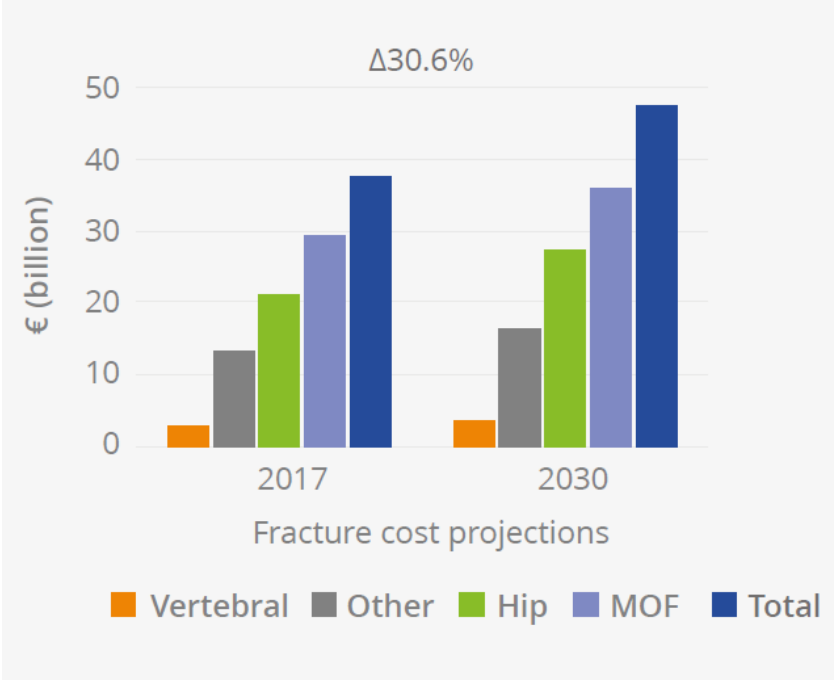


Estimated annual fracture-related costs for the EU6 in 2017



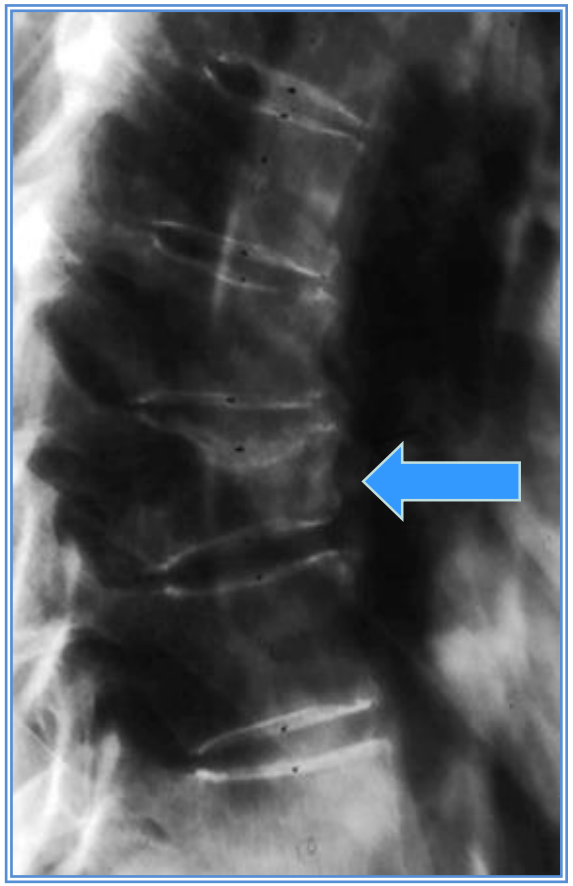
Estimated annual fracture-related costs in 2017 and 2030, and percentage change for the EU6





Stima del rischio di frattura

Risk of New Fragility Fractures



- Women with vertebral fractures have a 5-fold increased risk of a new vertebral fracture and a 2-fold increased risk of hip fracture

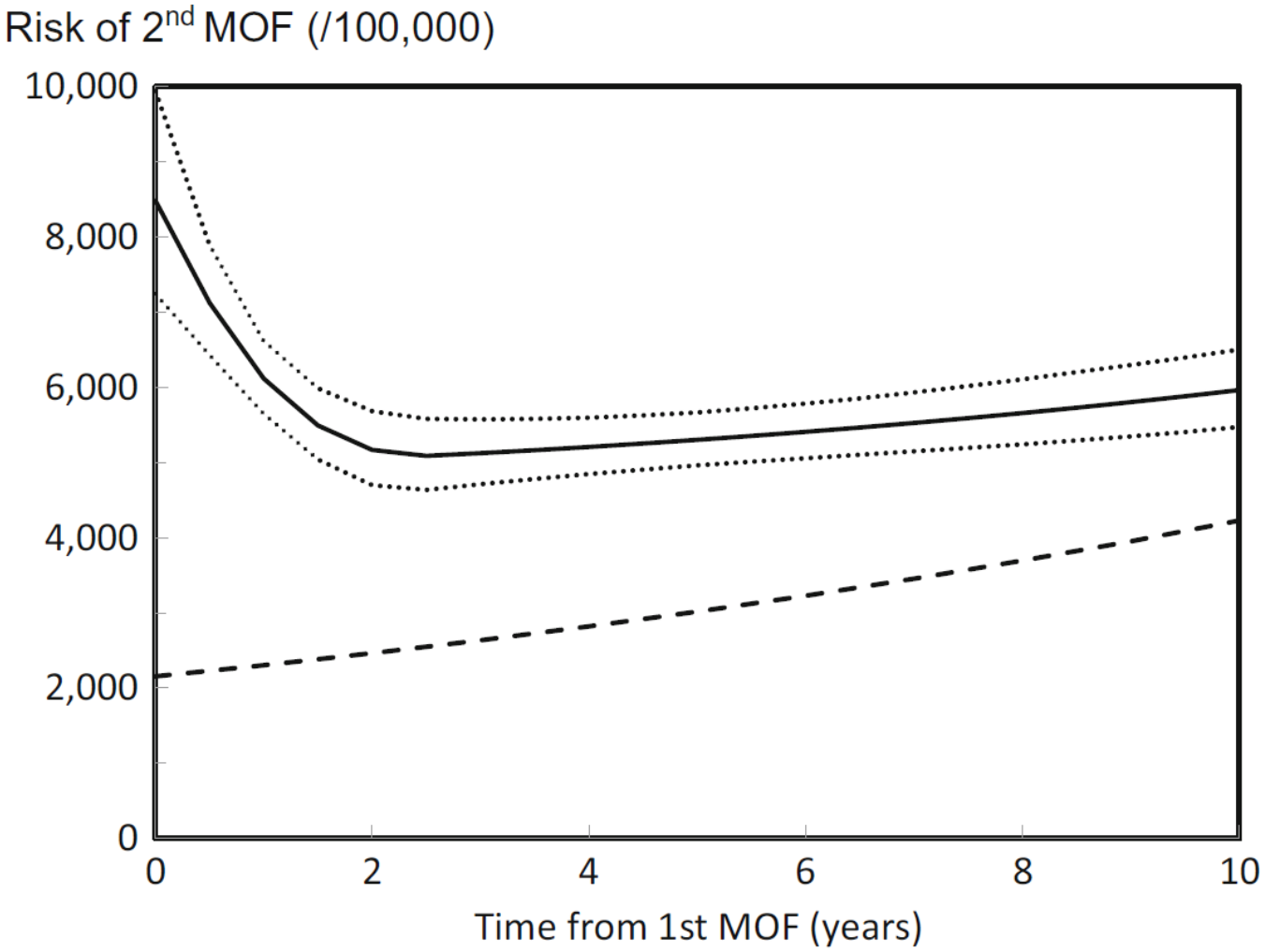
  Black et al., J Bone Miner Res 1999

  Melton et al, Osteoporos Int 1999

- One woman in five will suffer from another vertebral fracture within a year

  Lindsay et al., JAMA, 2001

Risk per 100,000 of a second MOF after a first MOF for a woman at the age of 75 yrs at her first fracture



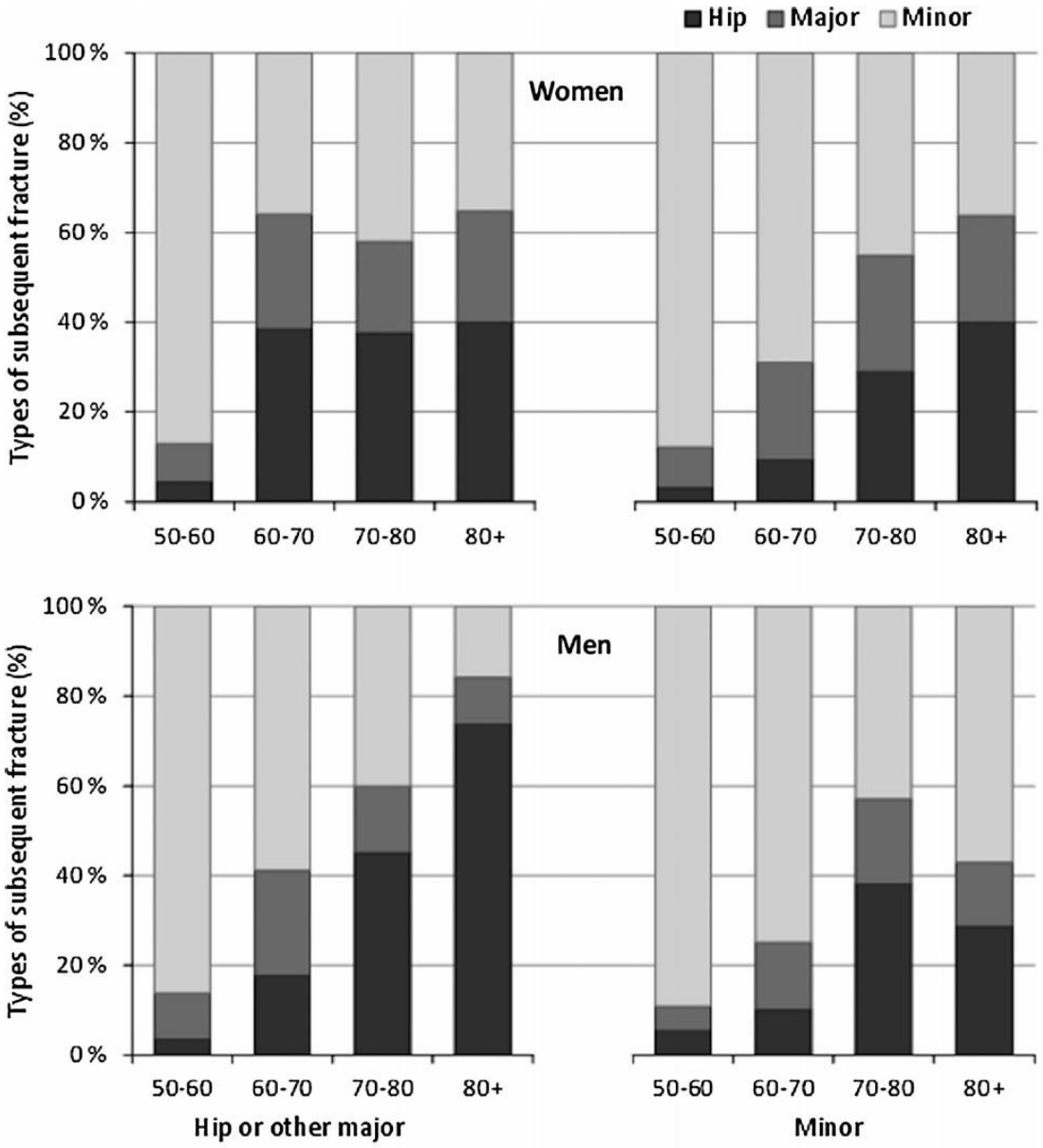
Johansson H et al. Osteoporos Int 2017

10-Year Probability of Recurrent Fractures Following Wrist and Other Osteoporotic Fractures in a Large Clinical Cohort: An Analysis From the Manitoba Bone Density Program

Site of Primary Fracture	HR (95% CI) for Any Osteoporotic Fracture[b]	*P* Value	HR (95% CI) for Hip Fracture[b]	*P* Value
Wrist	1.58 (1.29-1.93)	<.001	1.29 (0.88-1.89)	.19
Any nonwrist	2.66 (2.30-3.08)	<.001	1.72 (1.31-2.26)	<.001
Humerus	3.18 (2.56-3.94)	<.001	2.06 (1.35-3.15)	<.001
Spine	2.73 (2.21-3.36)	<.001	1.52 (1.01-2.30)	.046
Hip	2.00 (1.53-2.63)	<.001	1.67 (1.08-2.58)	.02

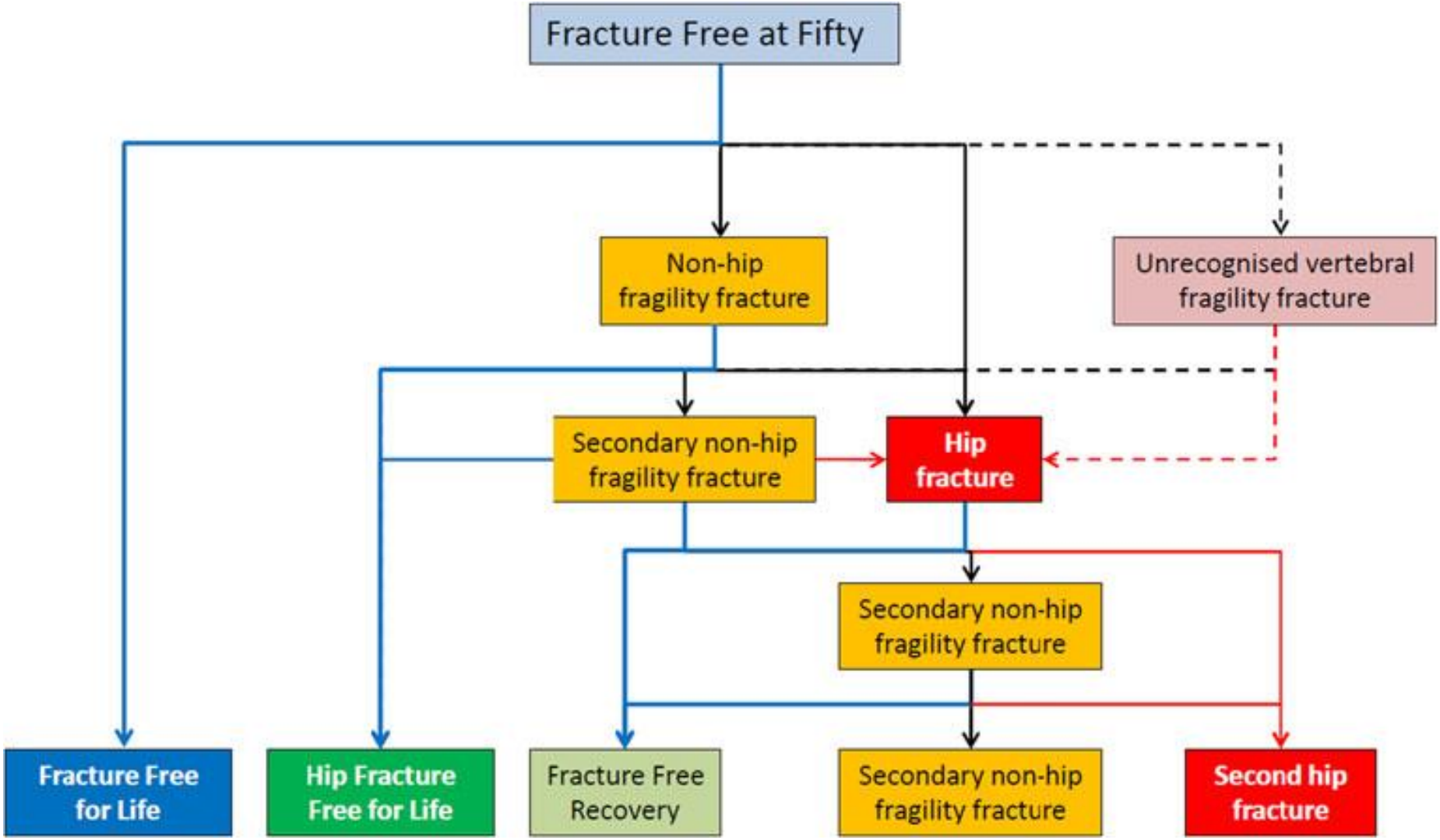
Hodsman AB et al. Arch Intern Med 2008

Subsequent fractures by types and age of initial fracture

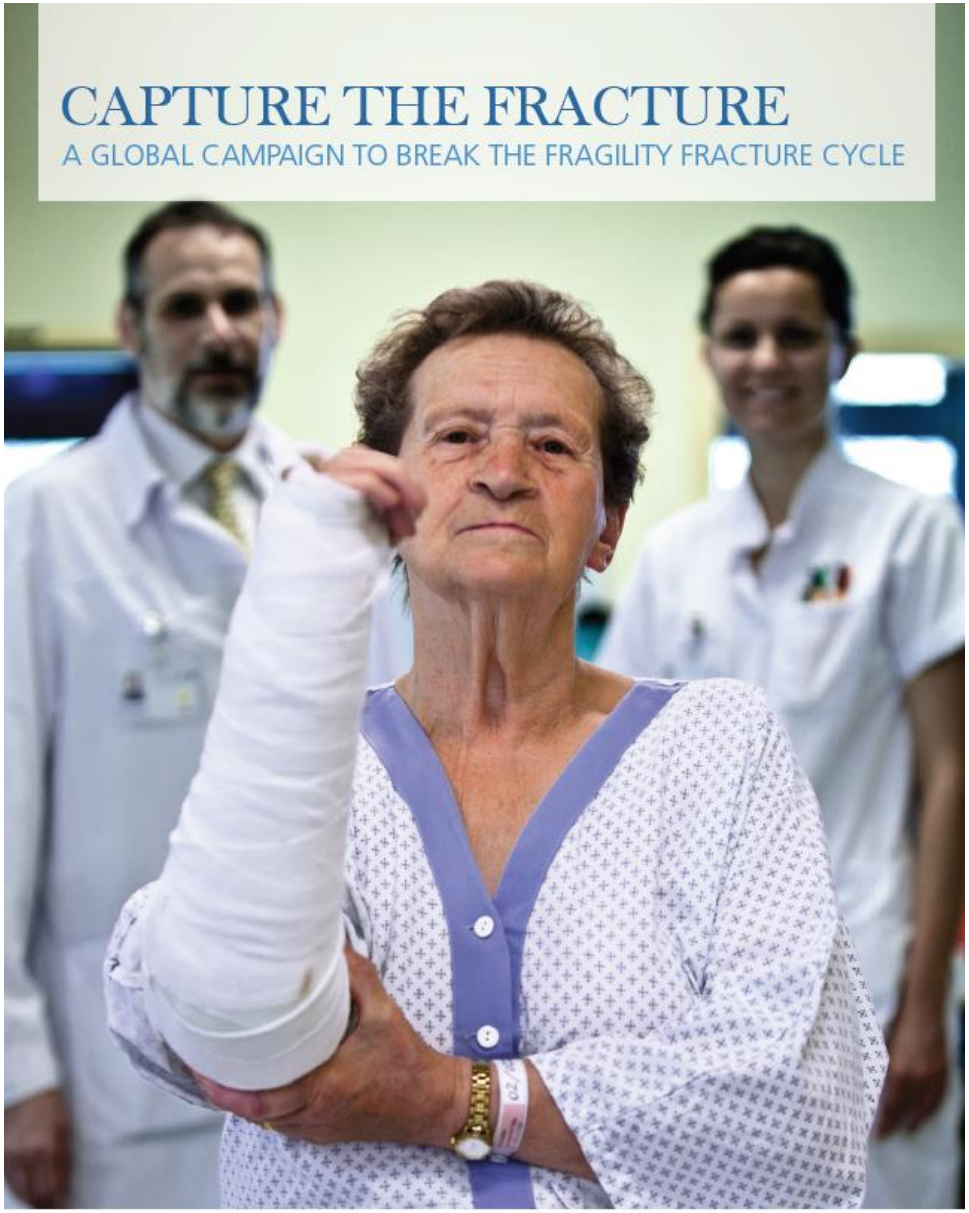


Ahmed LA et al. J Bone Miner Metab 2013

The fragility fracture cycle



Akesson K et al Osteoporos Int 2013



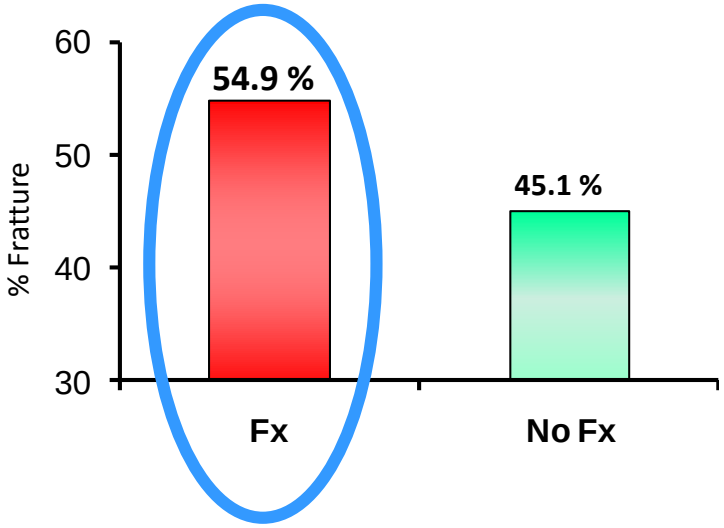
By ***missing the opportunity*** to respond to the first fracture, healthcare systems around the world are ***failing to prevent*** the second and subsequent fractures

www.iofbonehealth.org

International Osteoporosis Foundation

Studio BREAK

- Schede pervenute al CNR: 1288.
- Pazienti arruolati : 1249
- Età media: 80.9±7.3 anni (range: 60-99 anni)
- Radiografie D/L complete: 727
- Radiografie valutabili: 689



Gonnelli S et al. Osteoporos Int 2013

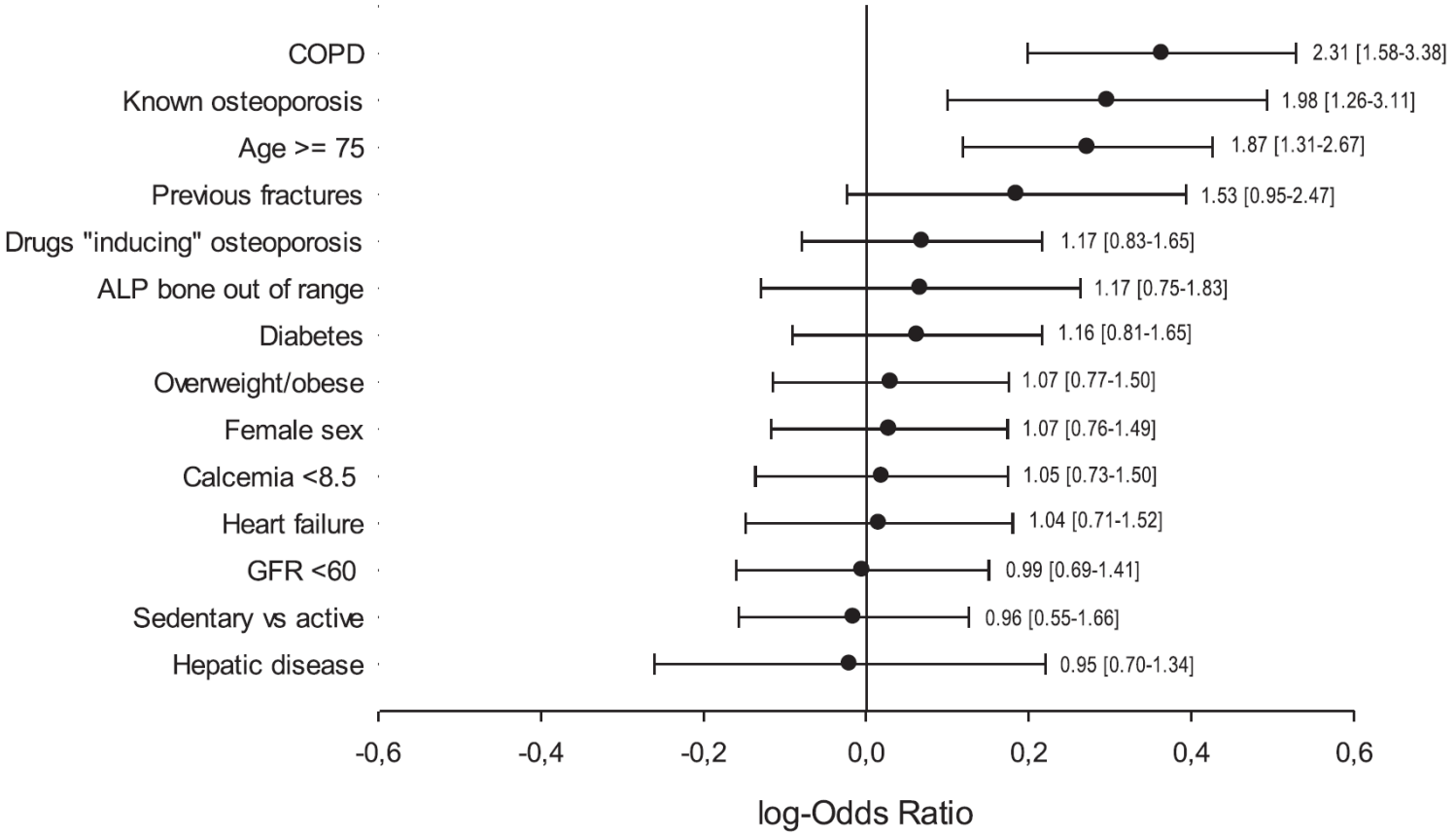
Contents lists available at ScienceDirect

Bone

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

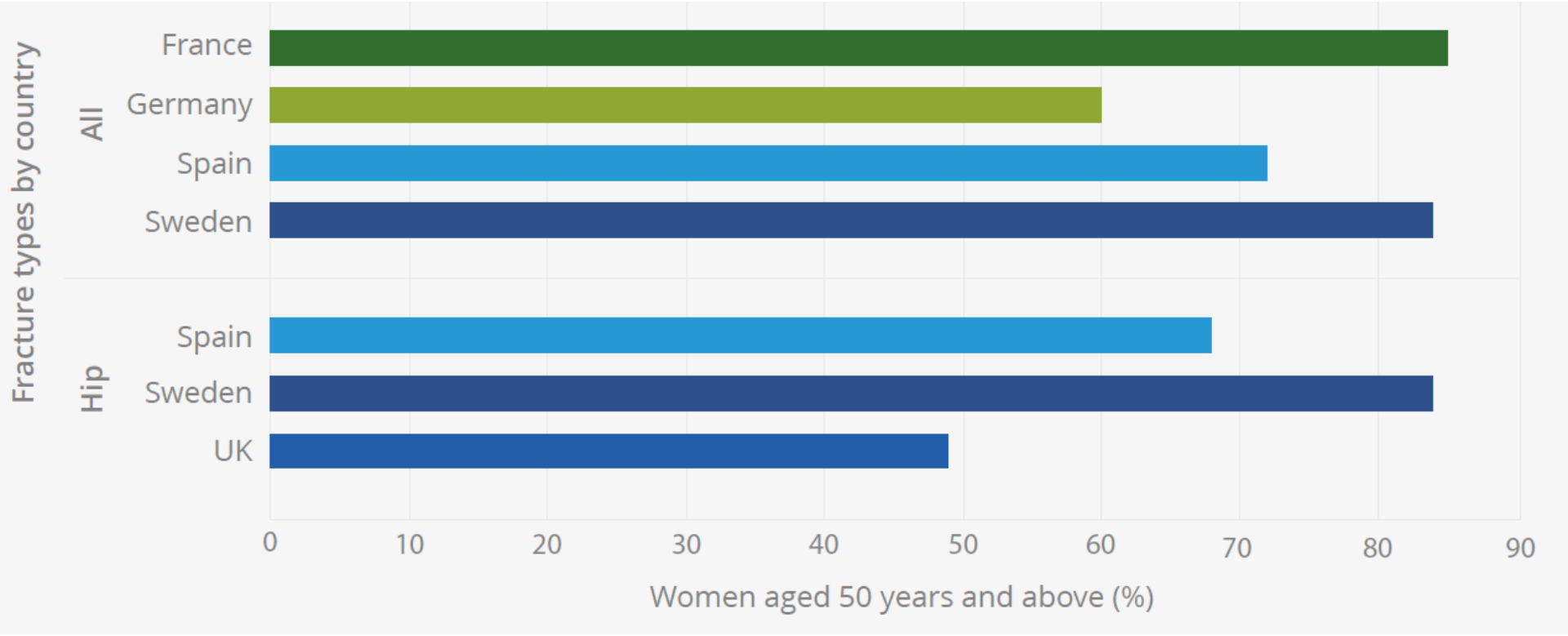
Original Full Length Article

High prevalence of fragility vertebral fractures in patients hospitalised in Internal Medicine Units. Results of the POINT (Prevalence of Osteoporosis in INTernal medicine) study



Vitali C et al. Bone 2015

Proportion (%) of female patients (50 years and above) untreated within a year of osteoporotic fracture

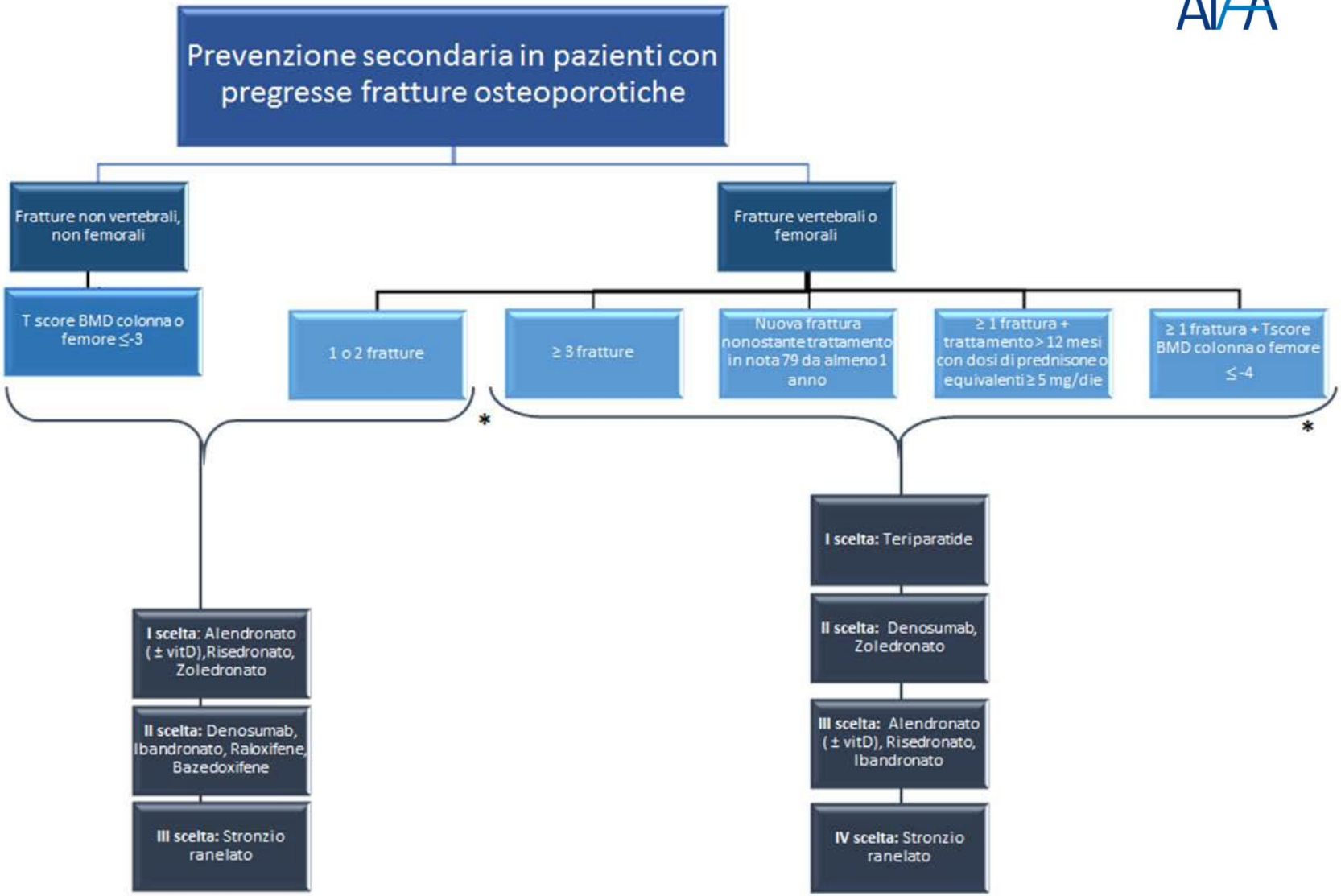


DETERMINA 14 maggio 2015.

Modifiche alla nota 79 di cui alla determinazione del 7 giugno 2011. (Determina n. 589/2015).

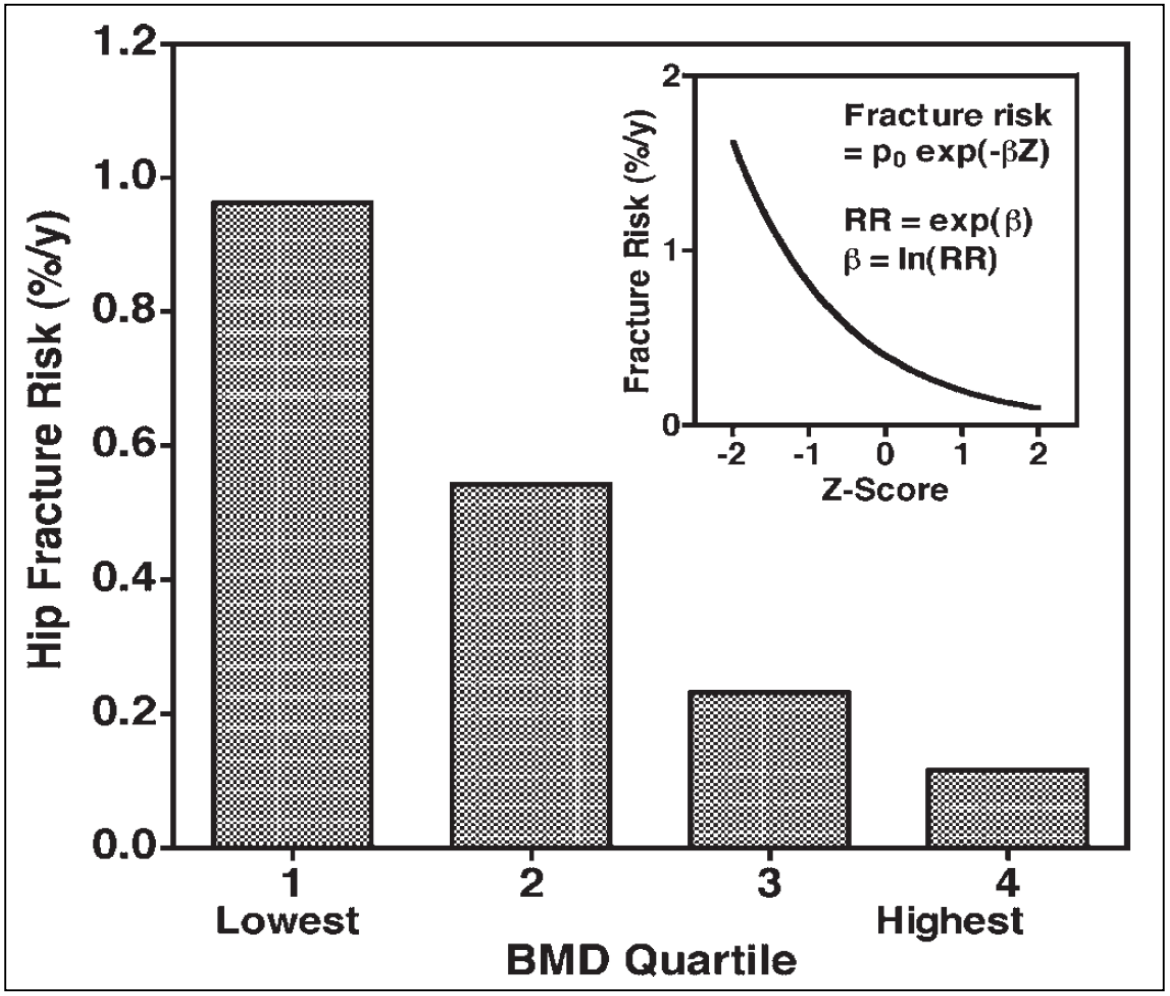
Agenzia Italiana del Farmaco

AIFA



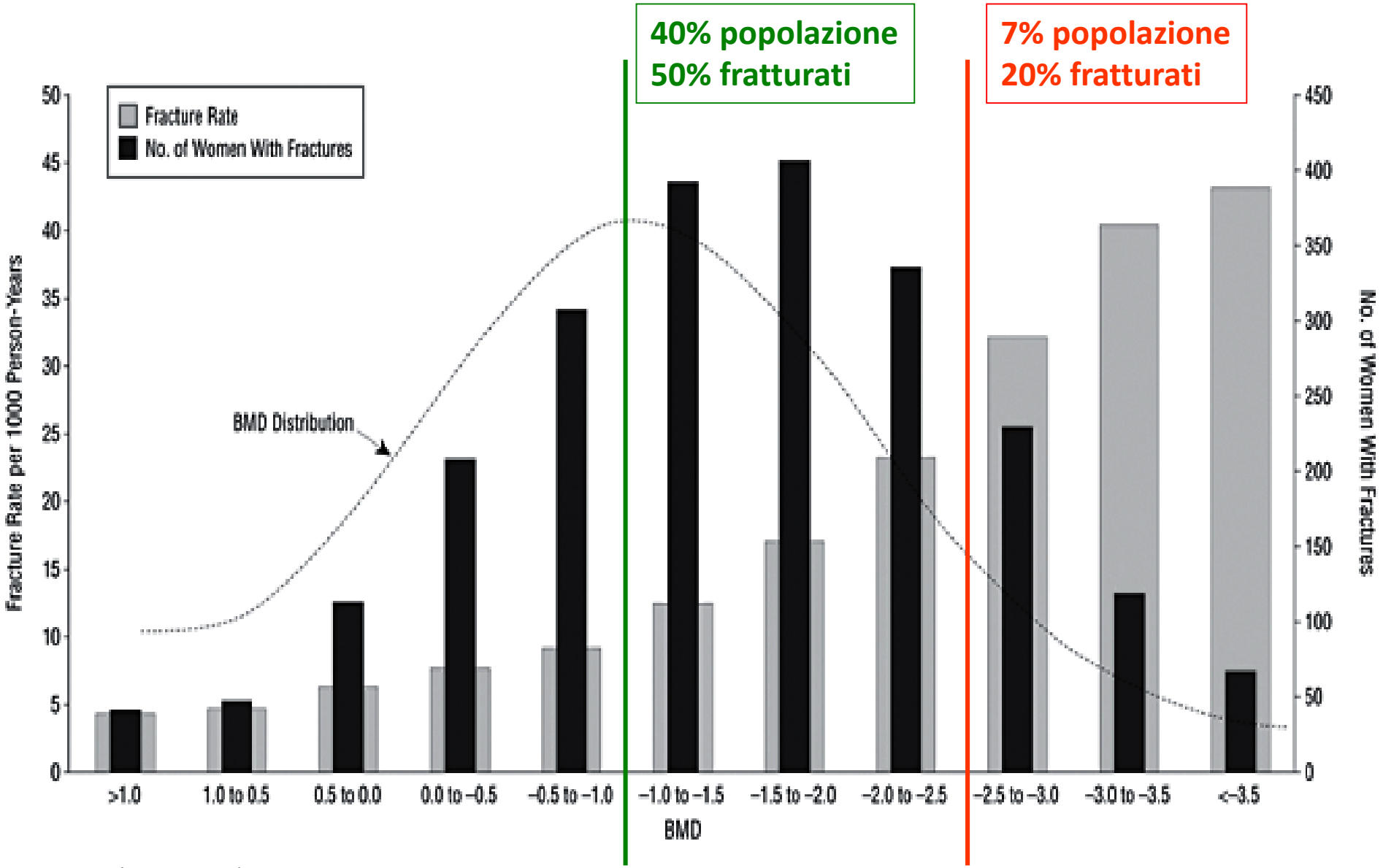
COME STIMARE IL RISCHIO DI FRATTURA NEI SOGGETTI SENZA UNA STORIA DI FRATTURA?

Incidence of hip fracture risk by BMD quartile for femoral neck BMD



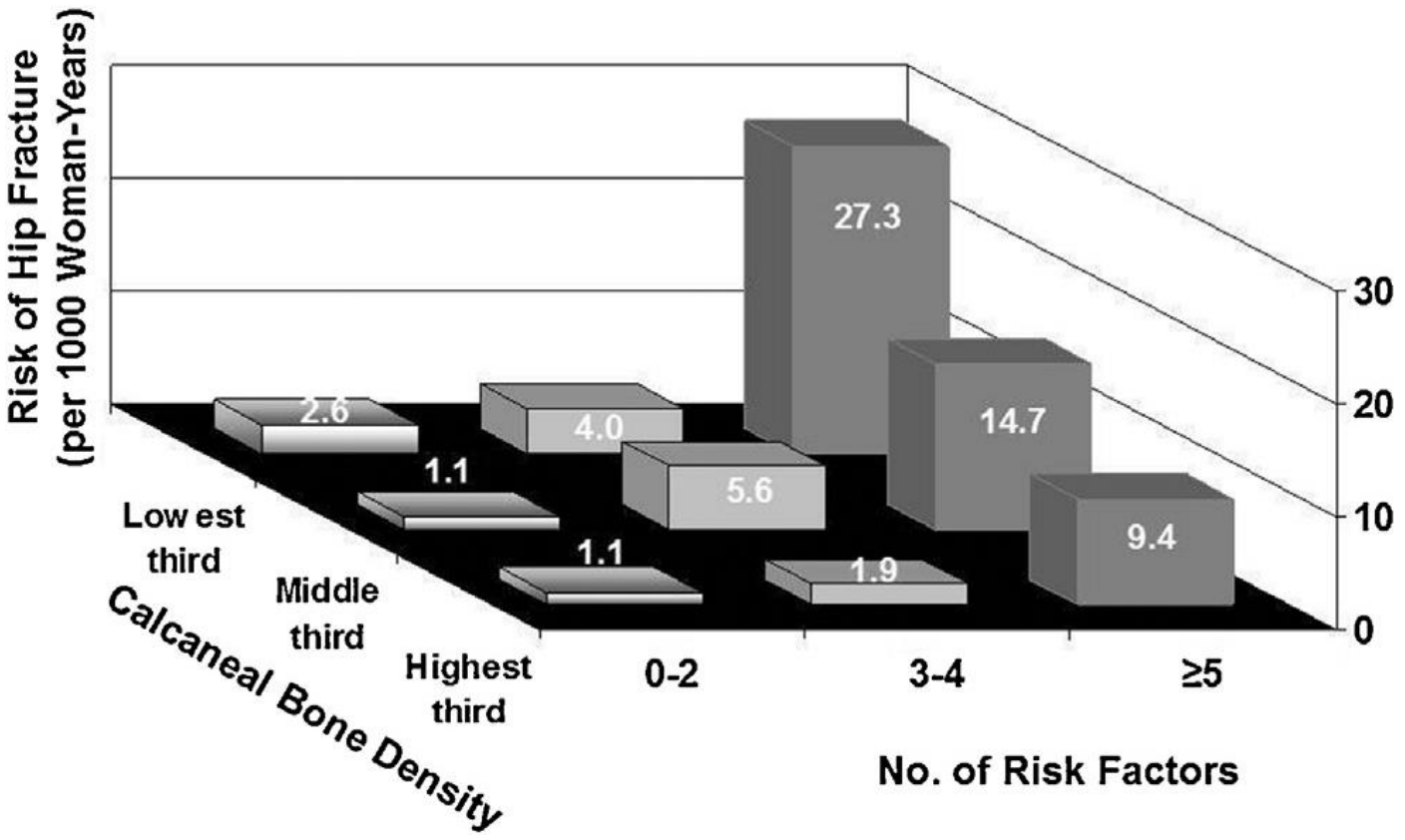
Blake GM et al. Semin Nucl Med 2010

La maggior parte dei fratturati non è osteoporotica (Studio NORA)



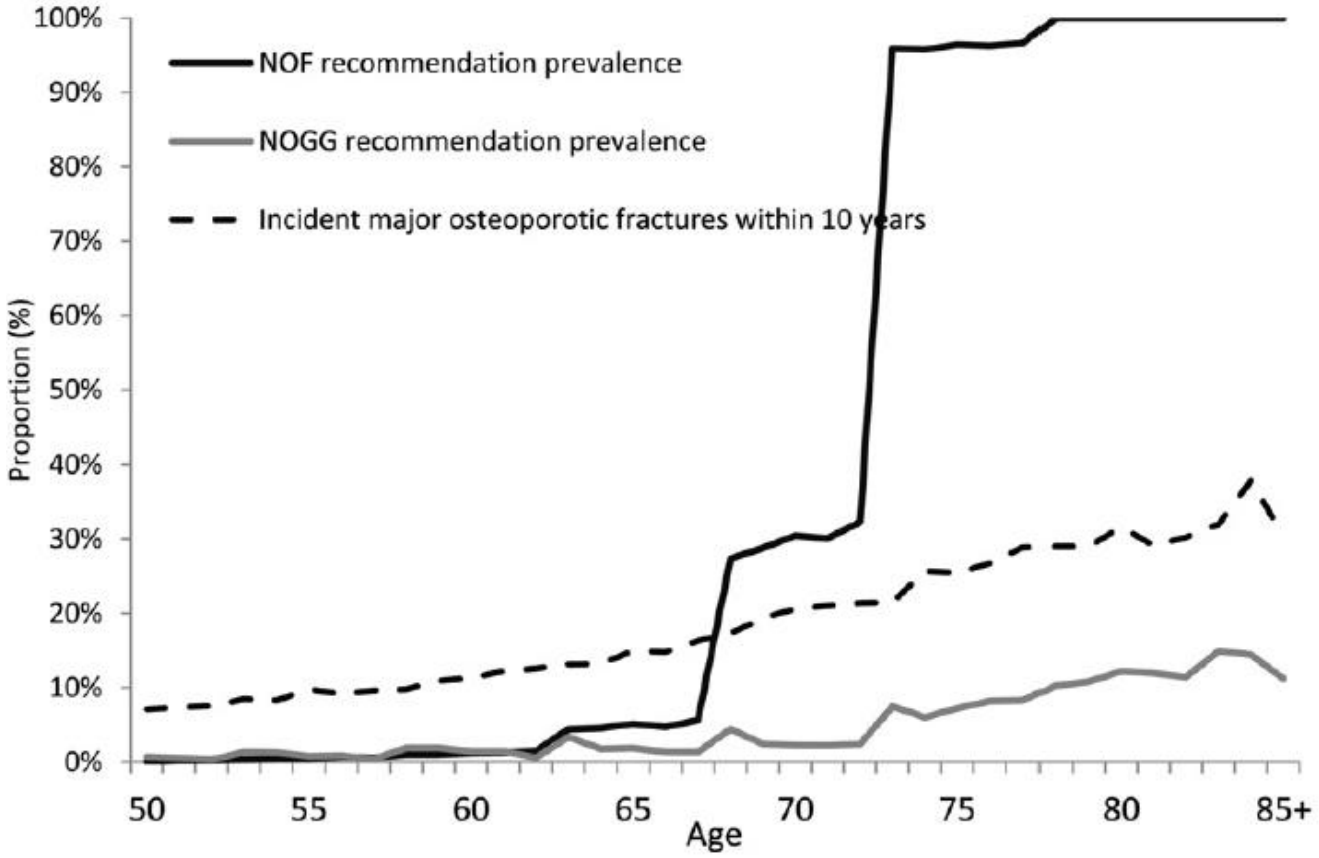
Siris ES, Arch Intern Med, 2004

Low BMD and other factors multiply risk of fracture



Cummings SR et al. N Eng J Med 1995

Estimated proportion recommended for treatment by age, per intervention criteria. FRAX without BMD, n=141320



Goldshtein I et al Bone 2017

Valutazione del Rischio Fratturativo: FRAX

Calcolo della probabilità a 10 anni di:

- fratture d'anca
- altre fratture maggiori da fragilità

Fattori di rischio clinici (CRF) presi in esame

- età
- BMI
- frattura pregressa
- Familiarità per frattura (femore)
- Fumo di sigaretta
- Alcool
- Glucocorticoidi
- Osteoporosi secondarie
- Artrite reumatoide

calibrato sui dati di mortalità e rischio di frattura specifici di molte nazioni (oltre 40)

prende in esame la BMD a livello femorale **(non obbligatorio)**

considera il "peso" dei fattori di rischio e le loro interazioni

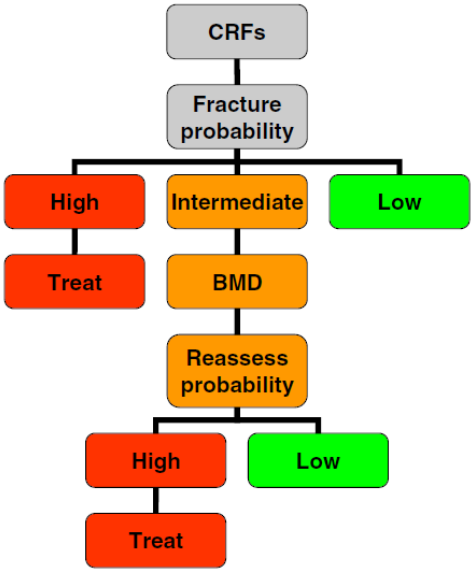
Considera l'aspettativa di vita dell'individuo

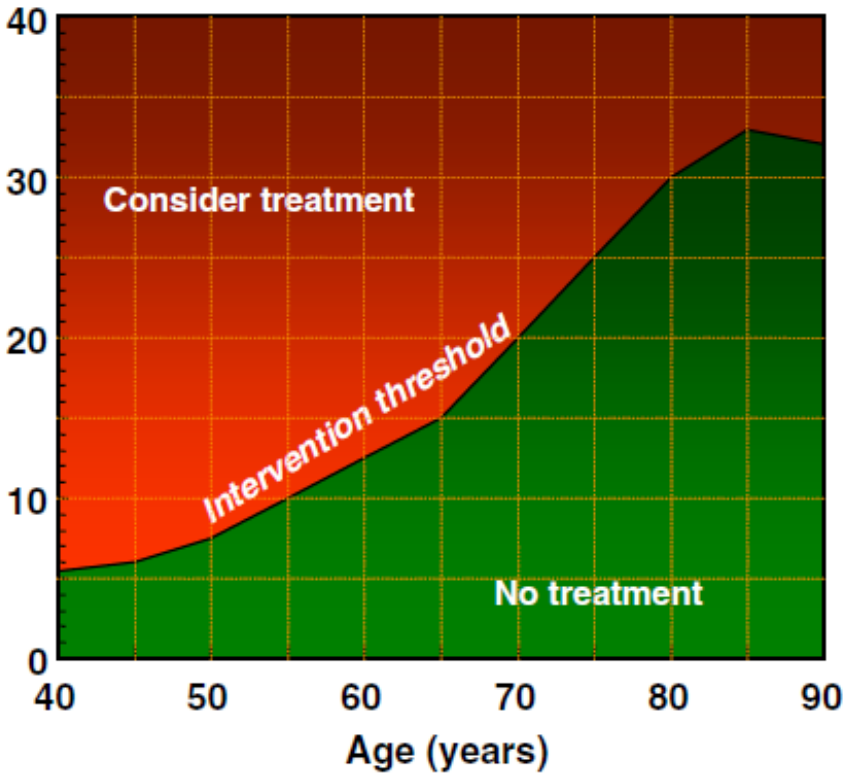
Case finding for the management of osteoporosis with FRAX®—assessment and intervention thresholds for the UK

J. A. Kanis · E. V. McCloskey · H. Johansson
O. Strom · F. Borgstrom · A. Oden ·
National Osteoporosis Guideline Group

Table 2 Probabilities of a major fracture and a hip fracture by age at which treatment is recommended (the intervention threshold) i.e. the fracture probability equivalent to that of a woman with a prior fracture and no other clinical risk factors

Age (years)	Major fracture	Hip fracture
50	7.5	1.0
55	10	1.5
60	12.5	2.4
65	15	3.6
70	20	5.6
75	25	8.4
80	30	12





Osteoporos Int (2008) 19:1395–1408

Valutazione del Rischio Fratturativo: FRAX

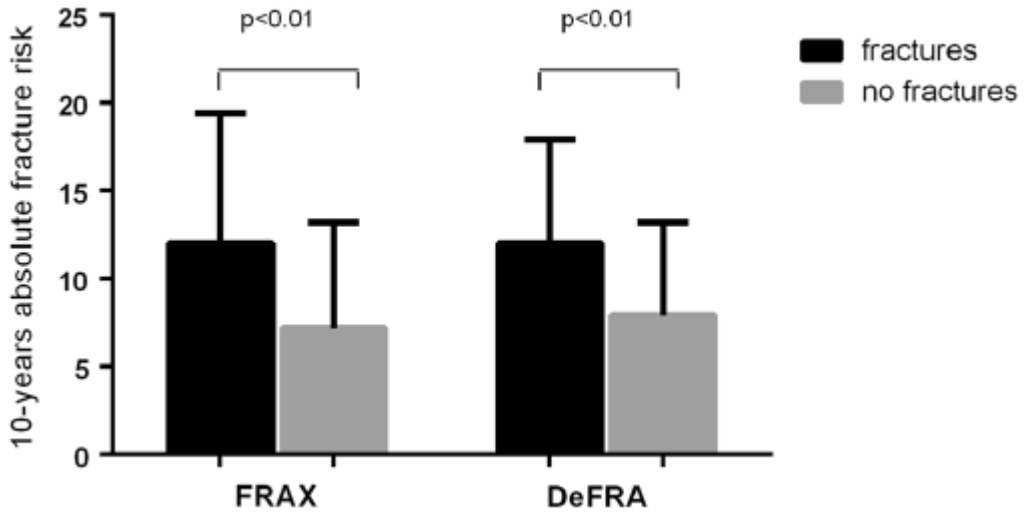
Punti di forza e Limitazioni del FRAX©	
Punti di Forza	**Limitazioni**
L'utilizzo del BMD e di fattori di rischio clinici facilmente valutabili ne migliora la sensibilità	**Non include alcuni importanti fattori di rischio clinico (es. cadute)**
Utilizza fattori di rischio dicotomici	
Fratture pregresse	Non permette di differenziare sulla base del numero, gravità e sede di frattura
Storia familiare di frattura d'anca	Non prevede familiarità per altre sedi di frattura
Assunzione attuale di fumo e alcolici	Non permette di quantificare l'assunzione
Terapia con glucocorticoidi (solo se >5 mg al giorno)	Dose, durata del trattamento, utilizzo di altri farmaci in grado di ridurre la forza del tessuto osseo
	Non prende in considerazione altre classi farmacologiche osteopenizzanti (es inibitori aromatasi)
Artrite reumatoide	Non stratifica per gravità di malattia o per l'utilizzo di altri trattamenti medici.
Cause secondarie	Generico. Non valutata la presenza di alcune patologie fortemente osteopenizzanti solo perché rare (es. Cushing, iperparatiroidismo, etc)
Utilizzo BMD a livello del collo del femore (maggior gradiente di rischio)	Non considera altri siti
Creato utilizzando ampie coorti, per molte nazione personalizzato	

Proportion of study subjects according to FRAX and DeFRA fracture risk categories

	FRAX risk categories				
	<10 % ($n = 772$)	10–19 % ($n = 164$)	20–29 % ($n = 41$)	30–39 % ($n = 8$)	≥40 % ($n = 4$)
DeFRA risk categories					
<10 % ($n = 717$)	694 (90)	23 (14)	0 (0)	0 (0)	0 (0)
10–19 % ($n = 198$)	71 (9)	114 (70)	10 (24)	2 (25)	1 (25)
20–29 % ($n = 34$)	4 (0.5)	16 (10)	13 (32)	1 (12)	0 (0)
30–39 % ($n = 16$)	3 (0.4)	5 (3)	6 (15)	2 (25)	0 (0)
≥40 % ($n = 24$)	0 (0)	6 (4)	12 (29)	3 (37)	3 (75)

Data were presented as n (% of subjects with the same FRAX risk category)

χ^2 test: $p < 0.001$



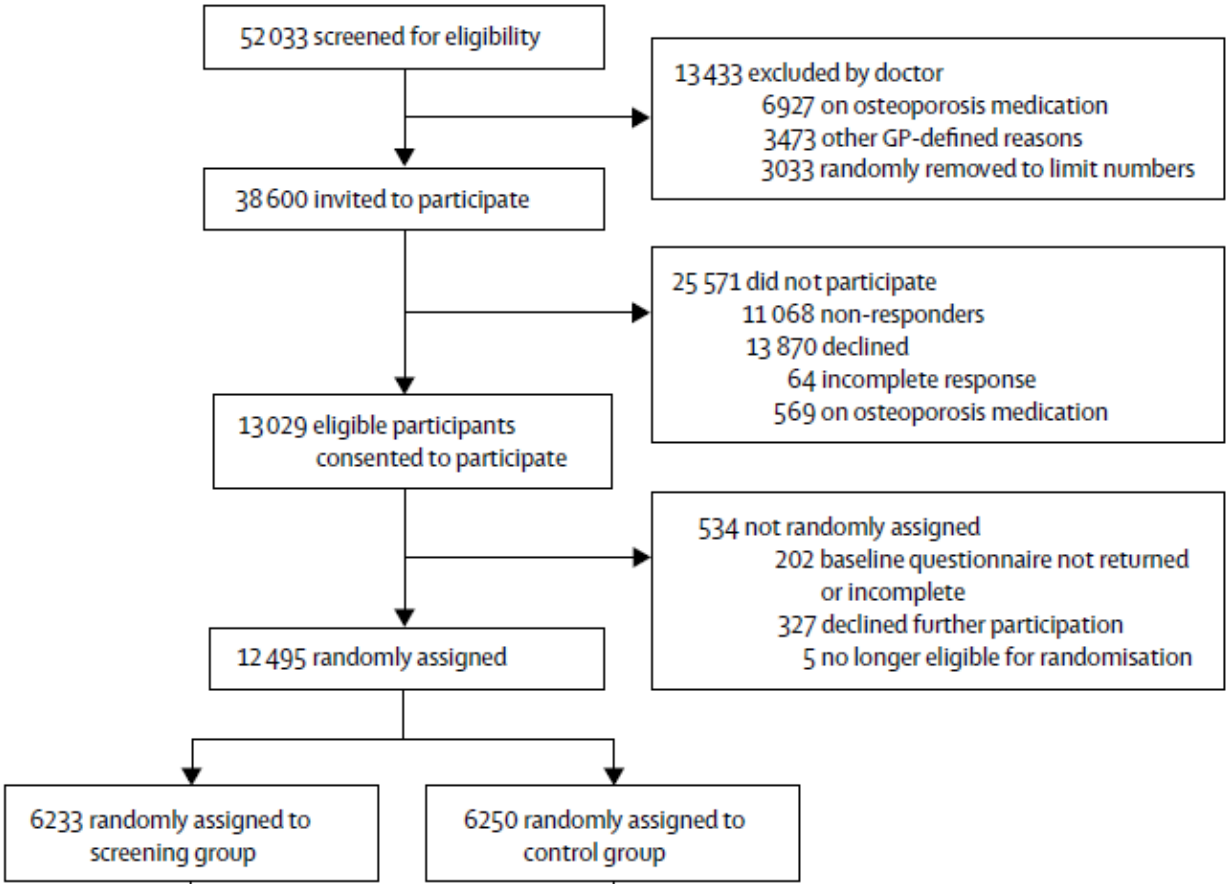
10-year absolute fractures as assessed by FRAX or DeFRA according to presence or absence of previous fractures

Bonaccorsi G et al Calcif Tissue Int 2015

Screening in the community to reduce fractures in older women (SCOOP): a randomised controlled trial

*Lee Shepstone, Elizabeth Lenaghan, Cyrus Cooper, Shane Clarke, Rebekah Fong-Soe-Khioe, Richard Fordham, Neil Gittoes, Ian Harvey, Nick Harvey, Alison Heawood, Richard Holland, Amanda Howe, John Kanis, Tarnya Marshall, Terence O'Neill, Tim Peters, Niamh Redmond, David Torgerson, David Turner, Eugene McCloskey; for the SCOOP Study Team**

Trial Profile



Shepstone L. et al Lancet 2018

Efficacy Outcomes

	Control (n=6250)	Screening (n=6233)	Hazard ratio (95% CI)*	p value
Osteoporosis-related				
No fracture	5398 (86·4%)	5428 (87·1%)	..	..
Fracture	852 (13·6%)	805 (12·9%)	0·94 (0·85–1·03)	0·178
Hips				
No fracture	6032 (96·5%)	6069 (97·4%)	..	..
Fracture	218 (3·5%)	164 (2·6%)	0·72 (0·59–0·89)	0·002
All clinical				
No fracture	5248 (84·0%)	5282 (84·7%)	..	..
Fracture	1002 (16·0%)	951 (15·3%)	0·94 (0·86–1·03)	0·183
Mortality				
Survived	5725 (91·6%)	5683 (91·2%)	..	..
Died	525 (8·4%)	550 (8·8%)	1·05 (0·93–1·19)	0·436

All clinical fractures included all osteoporosis-related fractures as well as fractures of the hands, feet, ankle, face, and skull. FRAX=Fracture Risk Assessment Tool. *Adjusted for recruiting region, baseline FRAX probability, and falls.

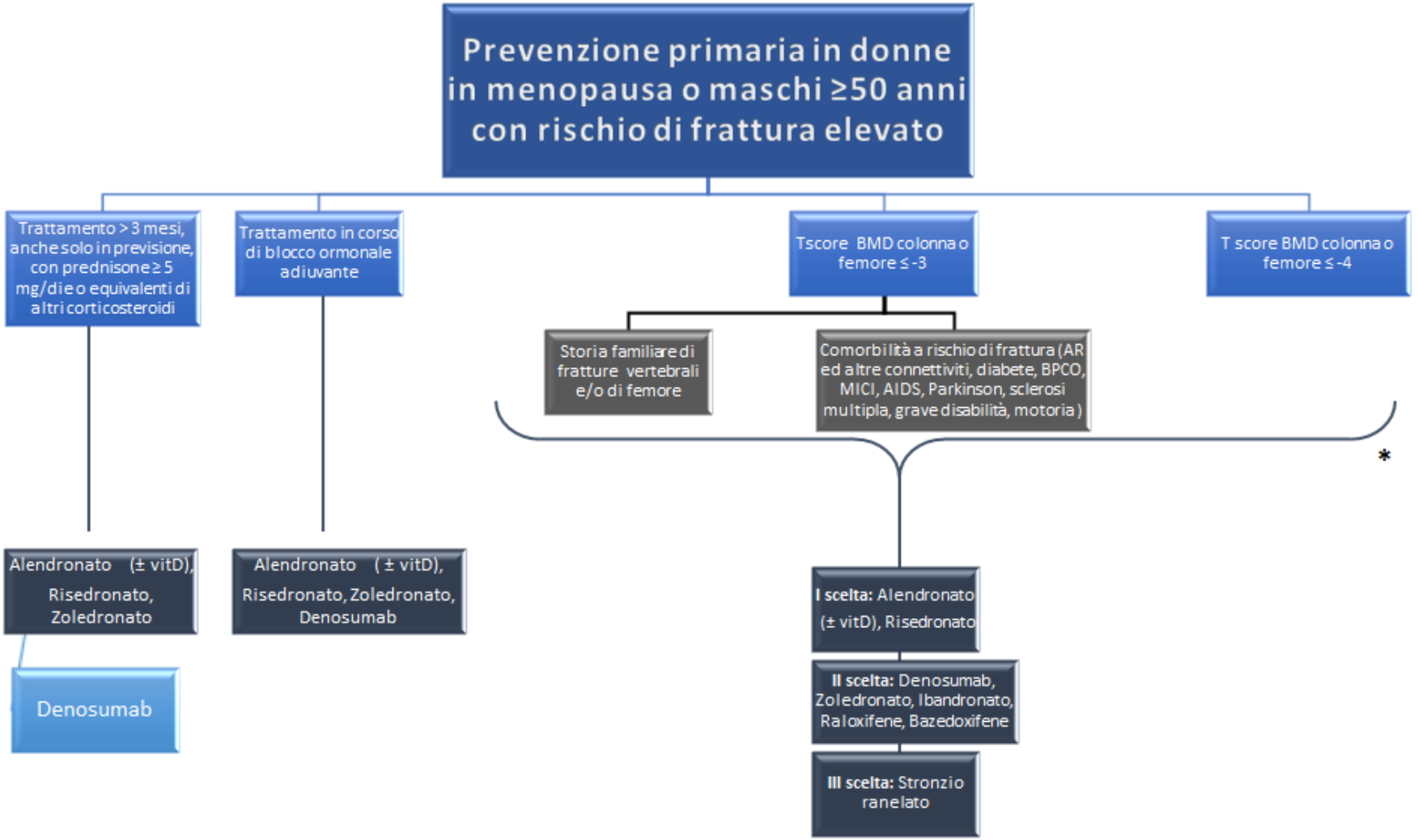
Shepstone L. et al Lancet 2018

Agenzia Italiana del Farmaco

AIFA

DETERMINA 14 maggio 2015.

Modifiche alla nota 79 di cui alla determinazione del 7 giugno 2011. (Determina n. 589/2015).



Prevenzione primaria in donne in menopausa o uomini di età ≥ 50 anni a rischio elevato di frattura a causa di almeno una delle condizioni sottoelencate

Condizione	I scelta [a]	II scelta	III scelta
Trattamento in atto o previsto per > 3 mesi con prednisone equivalente ≥ 5 mg/die	Alendronato (± vitD), Risedronato, Zoledronato [d],	denosumab	----------
Trattamento in corso di blocco ormonale adiuvante in donne con carcinoma mammario o uomini con carcinoma prostatico	Alendronato (± vitD), Risedronato, Zoledronato [d], Denosumab [e]	----------	----------
T-score colonna o femore [c] ≤ -4	Alendronato (± vit.D), Risedronato,	Denosumab [e], Zoledronato [d], Ibandronato Raloxifene, Bazedoxifene	Stronzio ranelato [f]
T-score colonna o femore [c] ≤ -3 + almeno una delle seguenti condizioni: 1) Familiarità per fratture di vertebre o femore 2) Comorbilità a rischio di frattura (artrite reumatoide o altre connettiviti, diabete, broncopneumopatia cronica ostruttiva, malattia infiammatoria cronica intestinale, AIDS, Parkinson, sclerosi multipla, grave disabilità motoria)			

Prevenzione primaria in donne in menopausa o uomini di età ≥ 50 anni a rischio elevato di frattura a causa di almeno una delle condizioni sottoelencate

Condizione	I scelta [a]	II scelta	III scelta
Trattamento in atto o previsto per > 3 mesi con prednisone equivalente ≥ 5 mg/die	Alendronato (± vitD), Risedronato, Zoledronato [d],	denosumab	----------
Trattamento in corso di blocco ormonale adiuvante in donne con carcinoma mammario o uomini con carcinoma prostatico	Alendronato (± vitD), Risedronato, Zoledronato [d], Denosumab [e]	----------	----------
T-score colonna o femore [c] ≤ -4	Alendronato (± vit.D), Risedronato,	Denosumab [e], Zoledronato [d], Ibandronato Raloxifene, Bazedoxifene	Stronzio ranelato [f]
T-score colonna o femore [c] ≤ -3 + almeno una delle seguenti condizioni: 1) Familiarità per fratture di vertebre o femore 2) Comorbilità a rischio di frattura (artrite reumatoide o altre connettiviti, diabete, broncopneumopatia cronica ostruttiva, malattia infiammatoria cronica intestinale, AIDS, Parkinson, sclerosi multipla, grave disabilità motoria)			

Prevenzione primaria in donne in menopausa o uomini di età ≥ 50 anni a rischio elevato di frattura a causa di almeno una delle condizioni sottoelencate

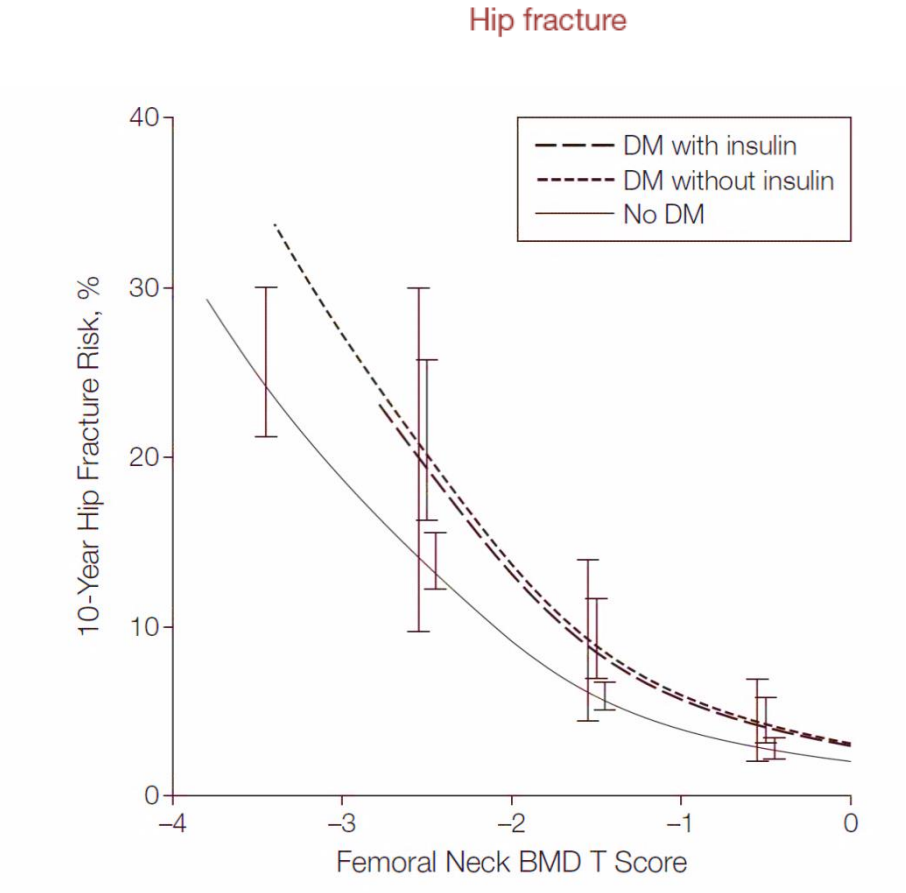
Condizione	I scelta [a]	II scelta	III scelta
Trattamento in atto o previsto per > 3 mesi con prednisone equivalente ≥ 5 mg/die	Alendronato (± vitD), Risedronato, Zoledronato [d],	denosumab	----------
Trattamento in corso di blocco ormonale adiuvante in donne con carcinoma mammario o uomini con carcinoma prostatico	Alendronato (± vitD), Risedronato, Zoledronato [d], Denosumab [e]	----------	----------
T-score colonna o femore [c] ≤ -4	Alendronato (± vit.D), Risedronato,	Denosumab [e], Zoledronato [d], Ibandronato Raloxifene, Bazedoxifene	Stronzio ranelato [f]
T-score colonna o femore [c] ≤ -3 + almeno una delle seguenti condizioni: 1) Familiarità per fratture di vertebre o femore 2) Comorbilità a rischio di frattura (artrite reumatoide o altre connettiviti, diabete, broncopneumopatia cronica ostruttiva, malattia infiammatoria cronica intestinale, AIDS, Parkinson, sclerosi multipla, grave disabilità motoria)			

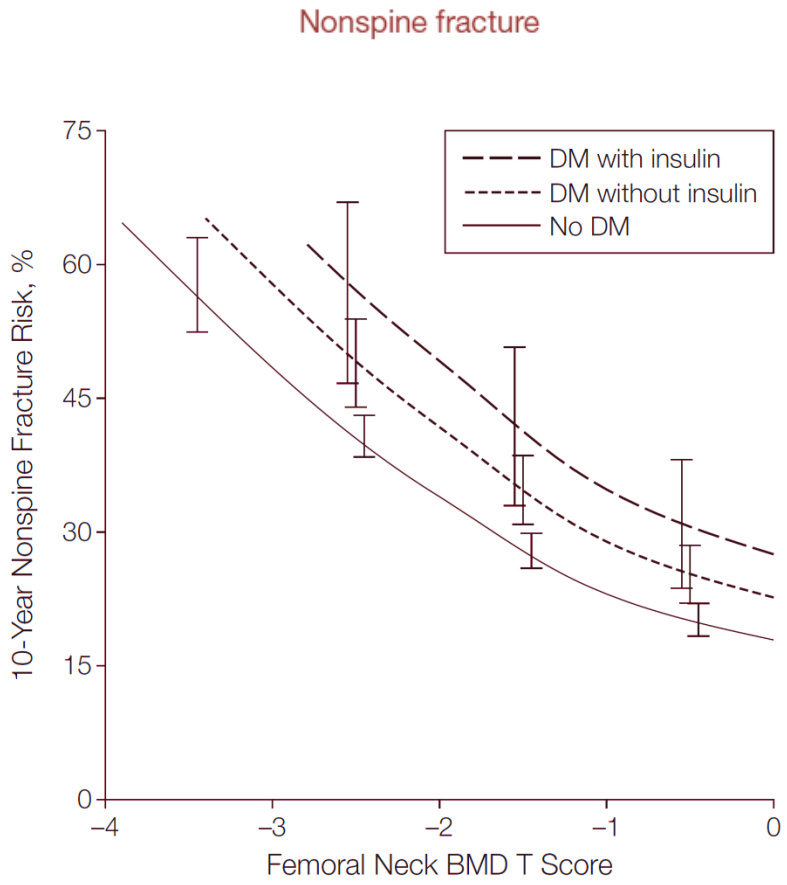
Prevenzione primaria in donne in menopausa o uomini di età ≥ 50 anni a rischio elevato di frattura a causa di almeno una delle condizioni sottoelencate

Condizione	I scelta [a]	II scelta	III scelta
Trattamento in atto o previsto per > 3 mesi con prednisone equivalente ≥ 5 mg/die	Alendronato (± vitD), Risedronato, Zoledronato [d],	denosumab	----------
Trattamento in corso di blocco ormonale adiuvante in donne con carcinoma mammario o uomini con carcinoma prostatico	Alendronato (± vitD), Risedronato, Zoledronato [d], Denosumab [e]	----------	----------
T-score colonna o femore [c] ≤ -4	Alendronato (± vit.D), Risedronato,	Denosumab [e], Zoledronato [d], Ibandronato Raloxifene, Bazedoxifene	Stronzio ranelato [f]
T-score colonna o femore [c] ≤ -3 + almeno una delle seguenti condizioni: 1) Familiarità per fratture di vertebre o femore 2) Comorbilità a rischio di frattura (artrite reumatoide o altre connettiviti, diabete, broncopneumopatia cronica ostruttiva, malattia infiammatoria cronica intestinale, AIDS, Parkinson, sclerosi multipla, grave disabilità motoria)			

DIABETE E RISCHIO DI FRATTURA

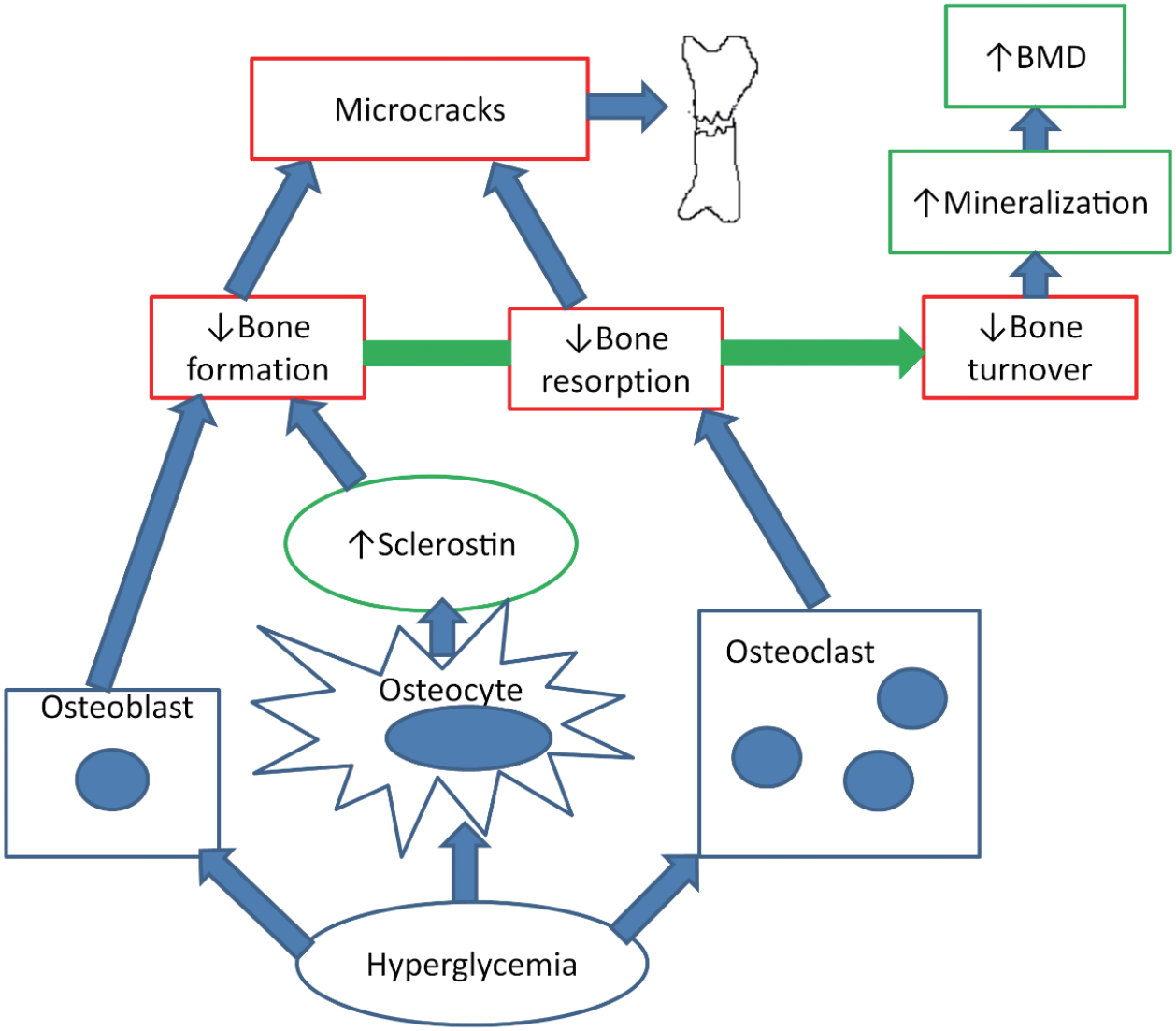
Femoral Neck BMD T Score and 10-Year Fracture Risk at Age 75 Years by DM and Insulin Use Status





Schwartz AV et al. JAMA 2011

Diabetes & Osteoporosis



Contents lists available at ScienceDirect

Journal of Diabetes and Its Complications 2018

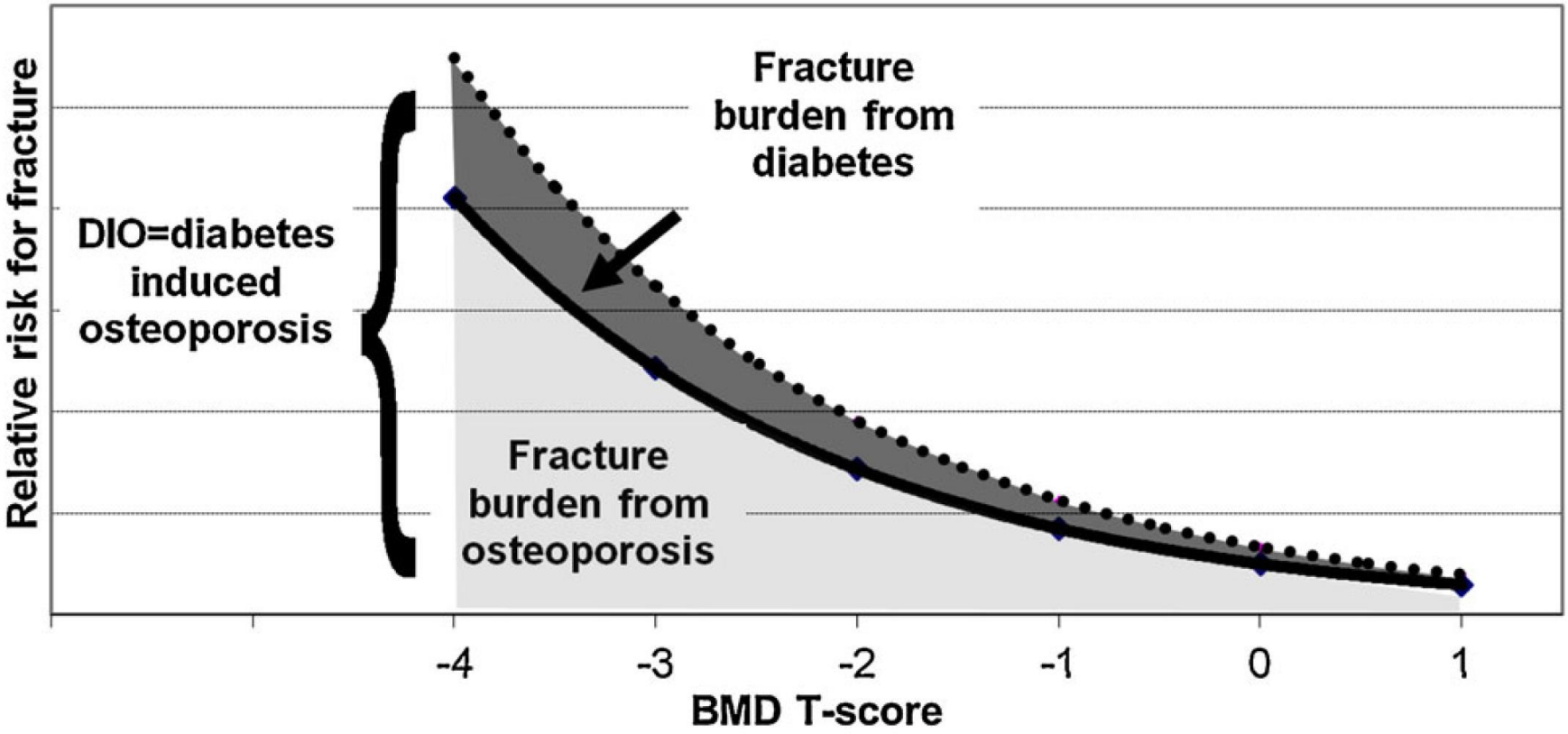
journal homepage: WWW.JDCJOURNAL.COM

The effects of diabetes therapy on bone: A clinical perspective

Karim G. Kheniser, Carmen M. Polanco Santos, Sangeeta R. Kashyap *

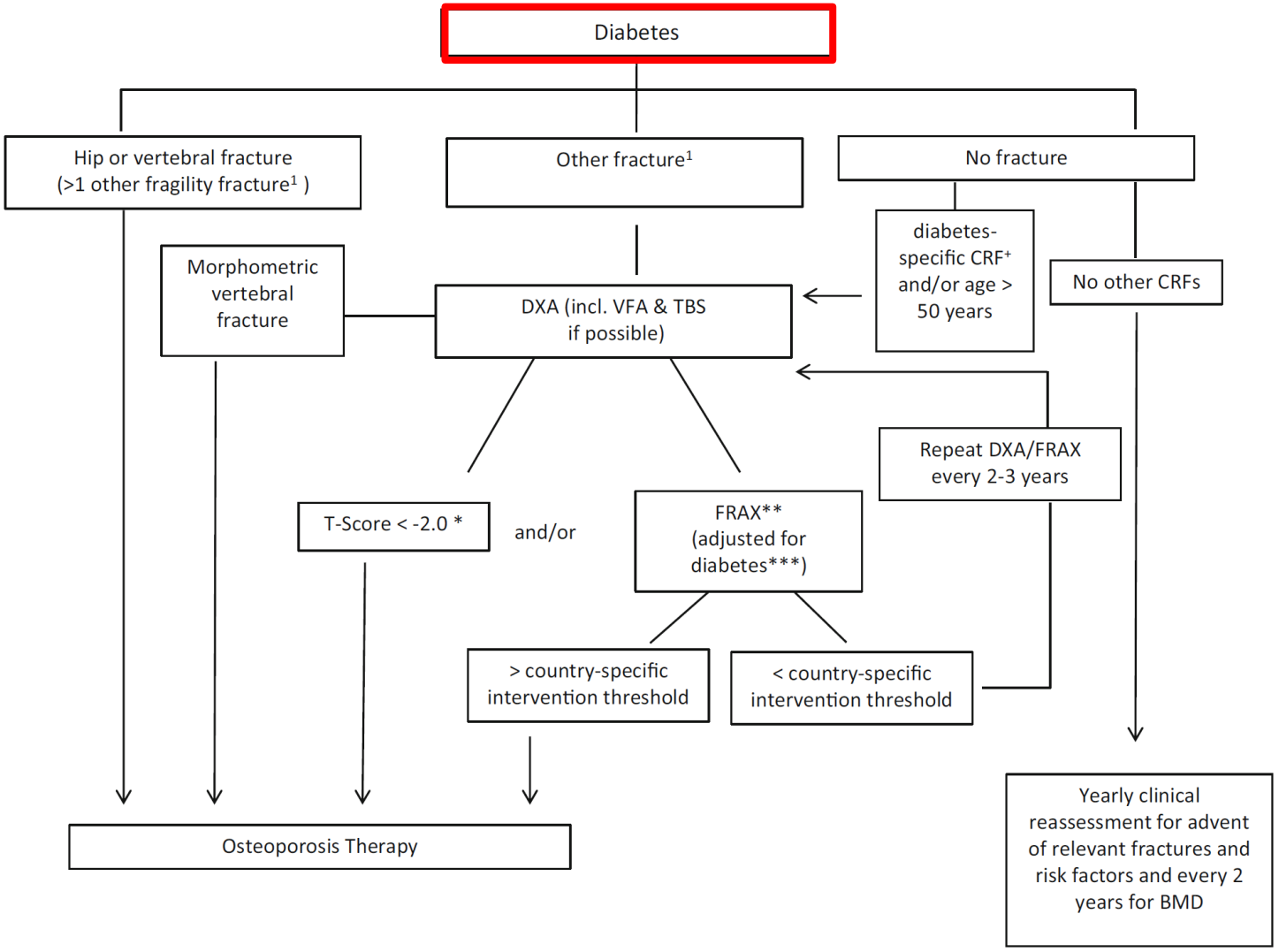
Treatment	Effect on bone	Fracture incidence
Insulin	Positive	↑
Thiazolidinediones	Negative	↑
Sodium-glucose inhibitors	TBD	TBD
Incretins	Positive	TBD
DPP-4 inhibitors	TBD	TBD
Biguanide	Positive	↓
Sulfonylureas	Neutral	↔*
Metabolic surgery	Negative	↑
Behavioral modification	Positive	↓

Diabetes and fractures



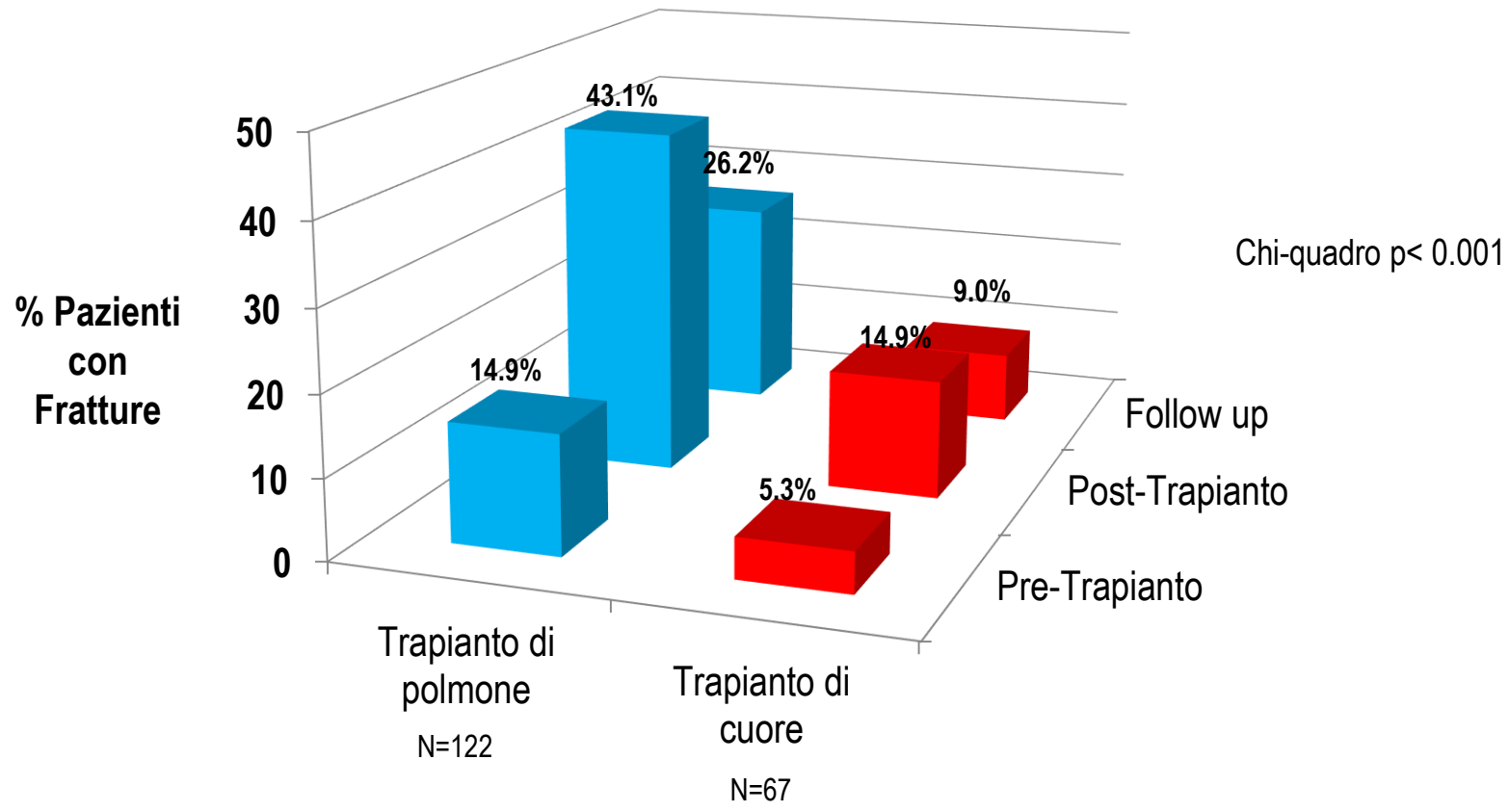
Schacter GI et al. Calcif Tissue Int 2017

Fracture risk evaluation in patients with diabetes



Ferrari SL et al. Osteoporos Int 2018

Percentuale dei soggetti che presentano fratture vertebrali nella fase pretrapianto, nel periodo post-trapianto e al follow-up



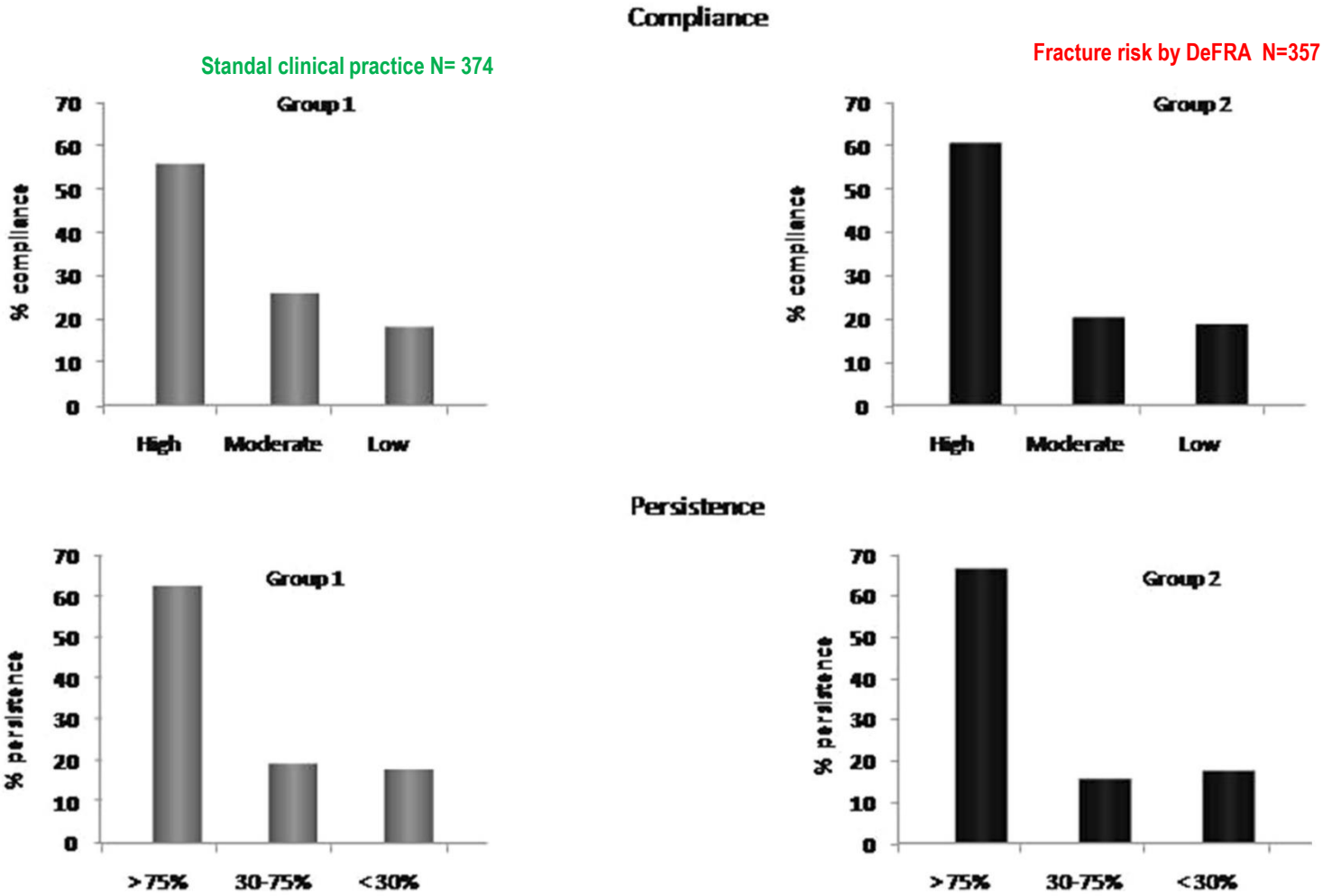
Stima del rischio di frattura

Aging Clin Exp Res (2016) 28:459–468
DOI 10.1007/s40520-016-0538-1

ORIGINAL ARTICLE

How the knowledge of fracture risk might influence adherence to oral therapy of osteoporosis in Italy: the ADEOST study

Stefano Gonnelli[1] · Carla Caffarelli[1] · Stefania Rossi[2] · Ombretta Di Munno[3] ·



Fratture da fragilità:

Cosa fare?

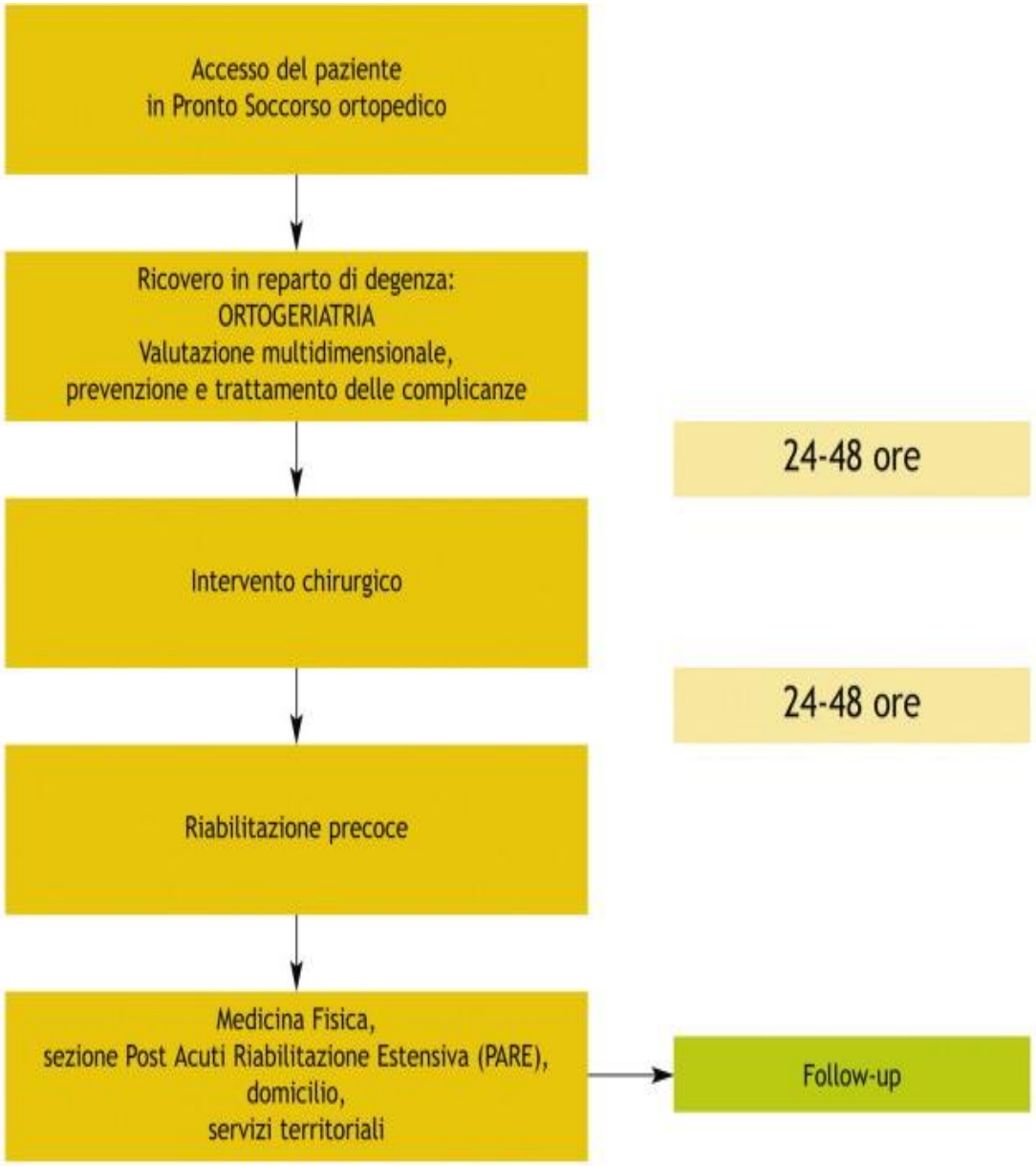
Gestione delle fratture da fragilità: Criticità

- Definizione di Frattura da Fragilità (DRG)
- Osteoporosi non riconosciuta come malattia cronica
- Differenze Regionali nella Gestione Sanitaria
- Coinvolgimento di più specialisti

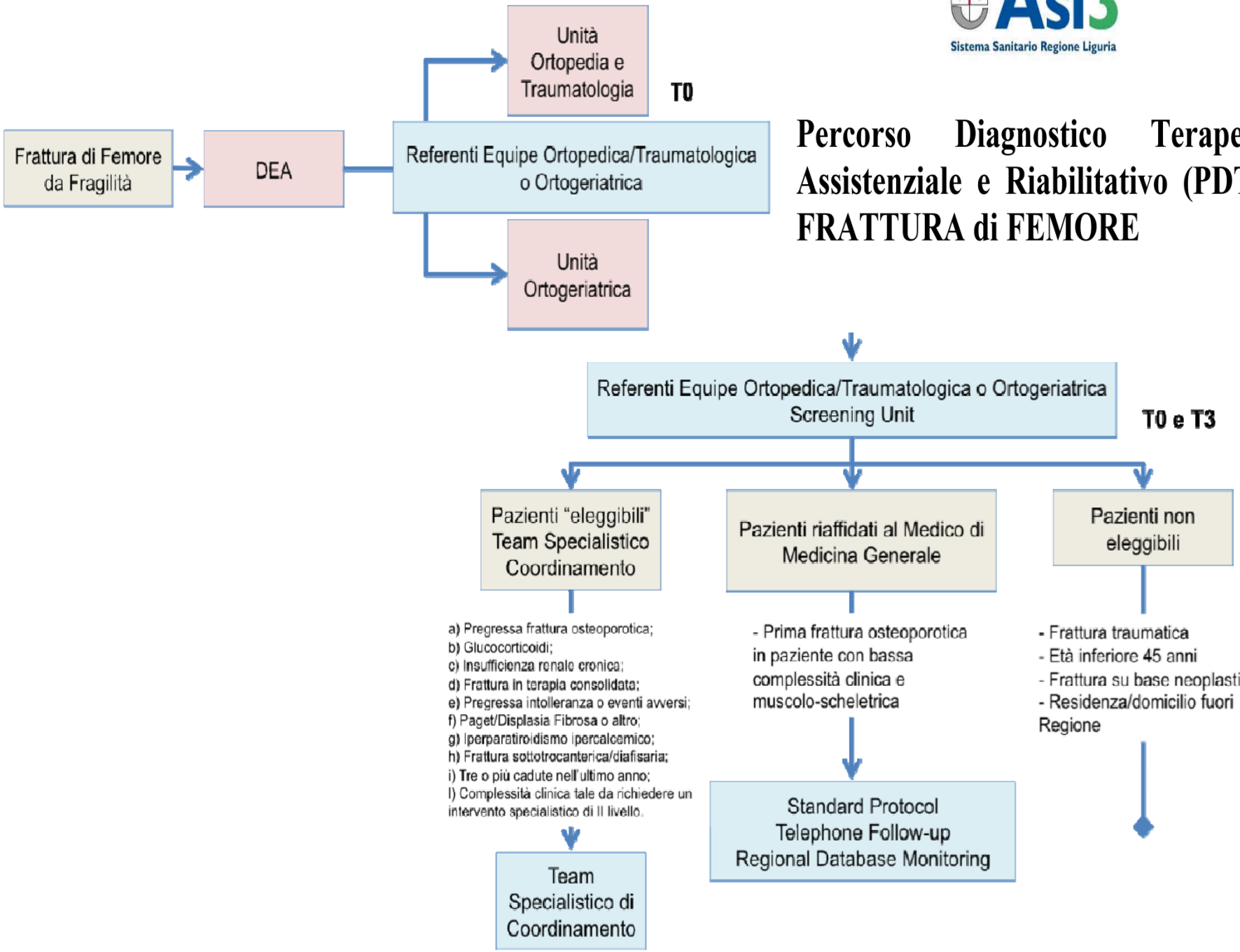
Gestione delle fratture da fragilità: Modelli Esistenti

- Percorso Ortogeriatrico
- Bone Fracture Unit
- Fracture Liason Service
- PDTA Ospedale - Territorio

Gestione delle fratture da fragilità: Percorso Ortogeriatrico



Percorso Diagnostico Terapeutico Assistenziale e Riabilitativo (PDTAR) FRATTURA di FEMORE



Multidisciplinary models for secondary fracture prevention can contribute to closing the treatment gap

Fracture Liaison Service (FLS), are multidisciplinary healthcare delivery models for secondary fracture prevention. Systematically, they aim to identify, diagnose, and treat (by referral) all eligible patients within a local population who have suffered a fragility fracture, with the aim of reducing risk of subsequent fractures.

Contents lists available at ScienceDirect

Bone

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

Full Length Article

Fracture liaison services improve outcomes of patients with osteoporosis-related fractures: A systematic literature review and meta-analysis

Outcome measure[37]	Effect of FLS (absolute change)	95% CI	Duration of follow-up (months)	Number of studies included
BMD testing	+24%	0.18 to 0.29	3–26	37
Treatment initiation	+20%	0.16 to 0.25	3–72	46
Treatment adherence	+22%	0.13 to 0.31	3–48	9
Re-fracture rate	–5%	–0.08 to –0.03	6–72	11
Mortality	–3%	–0.05 to –0.01	6–72	15

Modified by Wu CH et al. Bone 2018

Endocrine
https://doi.org/10.1007/s12020-018-1824-9

ORIGINAL ARTICLE

Use of antiosteoporotic drugs and calcium/vitamin D in patients with fragility fractures: impact on re-fracture and mortality risk

Luca Degli Esposti[1] · Anna Girardi[1] · Stefania Saragoni[1] · Stefania Sella[4] · Margherita Andretta[2] · Maurizio Rossini[3] · Sandro Giannini[4] · on the behalf of the Study group

Study design

Administrative Database:

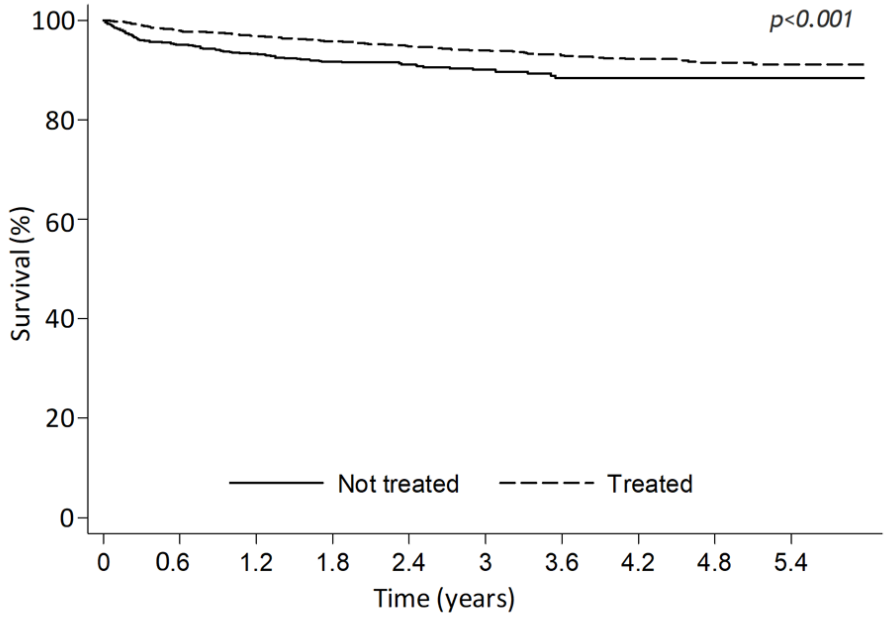
- Hospital Discharge Database (Napoli3, Verona, Udine,Frosinone, Pescara)

Enrollment criteria:

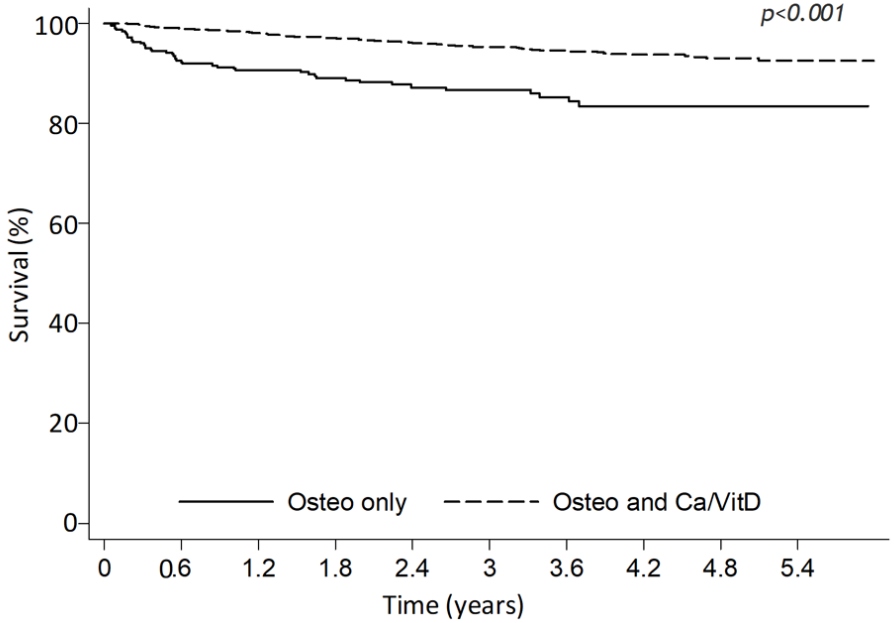
- At least one hospitalization discharge diagnosis of vertebral or femoral fracture from January 1, 2011 to June 30, 2015 (the date of the first discharge diagnosis is defined index-date).

Outcomes:

- Re-fracture episodes or death up to June 30, 2016



Incidence of re-fracture events during follow-up among patients treated or not with osteoporosis drugs.



Incidence of re-fracture events during follow-up among patients treated with osteoporosis drug only and osteoporosis drug with Calcium/Vitamin D supplement.

Degli Esposti et al. Endocrine 2018

BROKEN BONES, BROKEN LIVES:

A roadmap to solve the fragility fracture crisis in Italy

IOF
International
Osteoporosis
Foundation