



2ª JORNADA CATALANA D'ORTOGERIATRIA
2ª JORNADA CATALANA DE ORTOGERIATRIA
31 DE MAIG – 31 DE MAYO 2019

INCIDENCIA Y PREVALENCIA DE LA FRACTURA DE CADERA. ESTUDIOS POBLACIONALES ESPAÑOLES, DANESSES E INGLESES.

Daniel Martínez Laguna

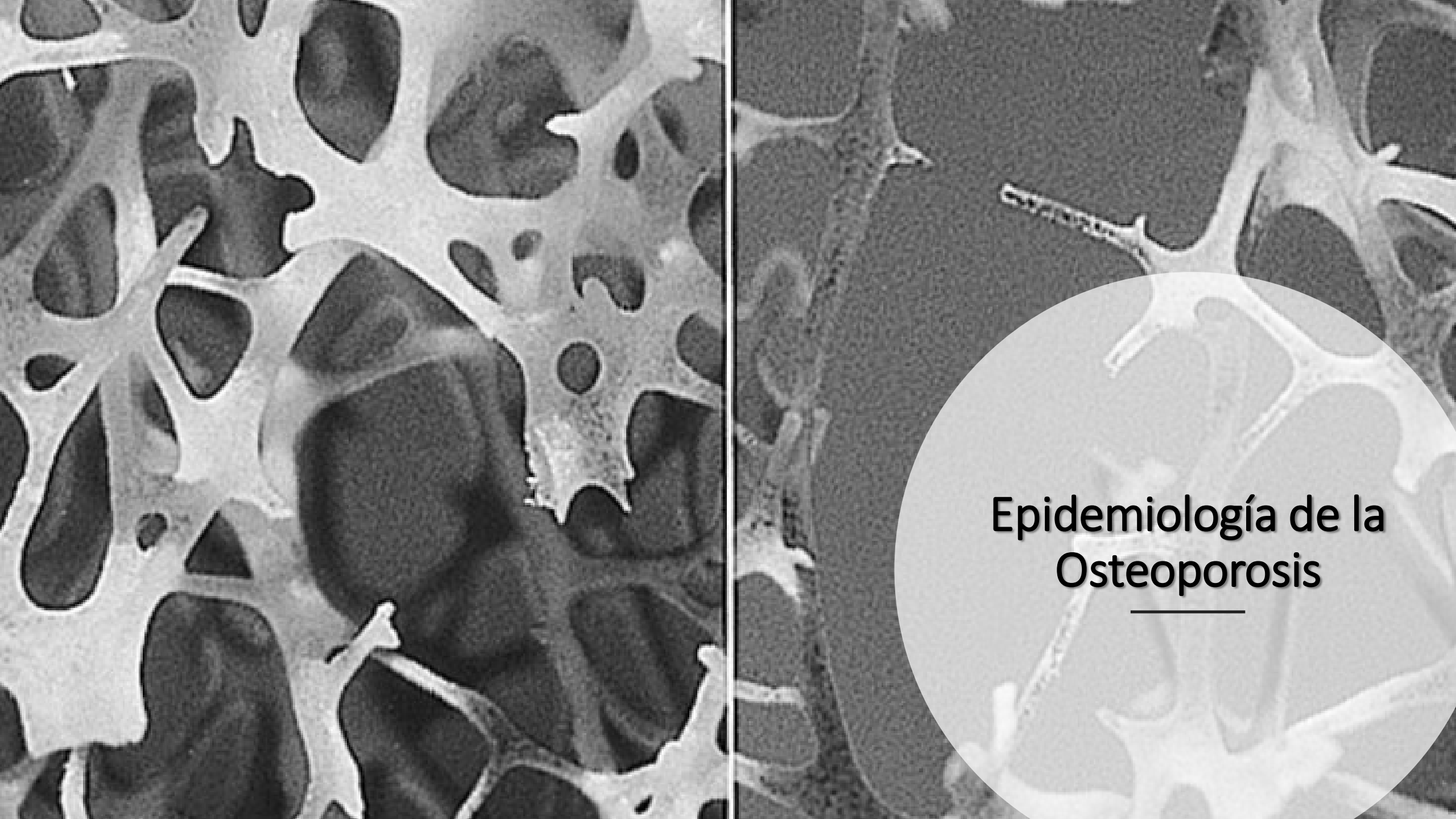
Grupo investigación GREMPAL IDIAP Jordi Gol. CIBER Fragilidad y Envejecimiento Saludable. CAP Sant Martí de Provençals (Barcelona) – Institut Català Salut



ciberfes

Conflictos de interés:

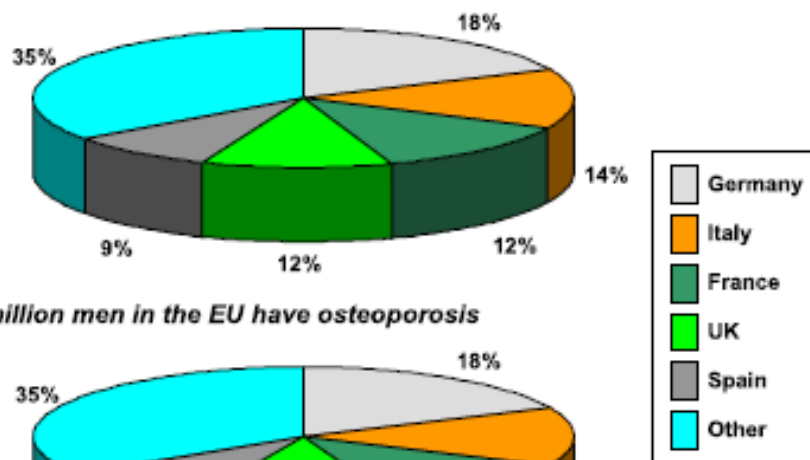
- *Becas de investigación IDIAP Jordi Gol, FEIOMM y del Instituto de Salud Carlos III.*
- *Advisory board y/o participación como ponente para AMGEN, Eli Lilly, Ferrer, Rubió y Novartis.*



**Epidemiología de la
Osteoporosis**

Epidemiología Osteoporosis

22.0 million women in the EU have osteoporosis



5.6 million men in the EU have osteoporosis

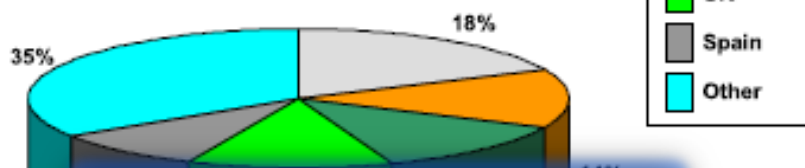
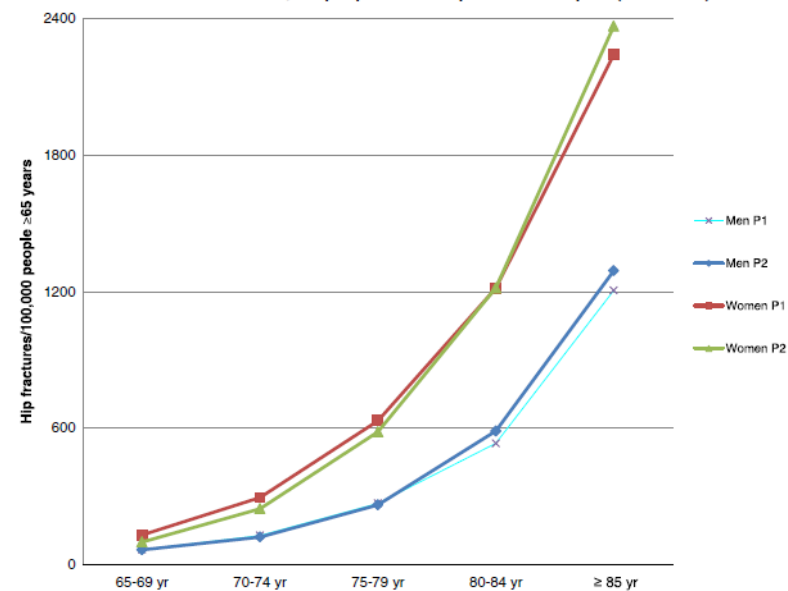


Table 2 Estimated number of women and men with osteoporosis (defined as a T-score ≤ -2.5 SD) in Spain by age using female-derived reference ranges at the femoral neck, 2010 [4]

Age (years)	Women	Men
50-54	96,705	37,625
55-59	127,104	44,415
60-64	182,039	68,382
65-69	217,756	71,188
70-74	272,304	62,790
75-79	369,375	76,014
80+	687,704	135,954
50+	1,952,987	496,368



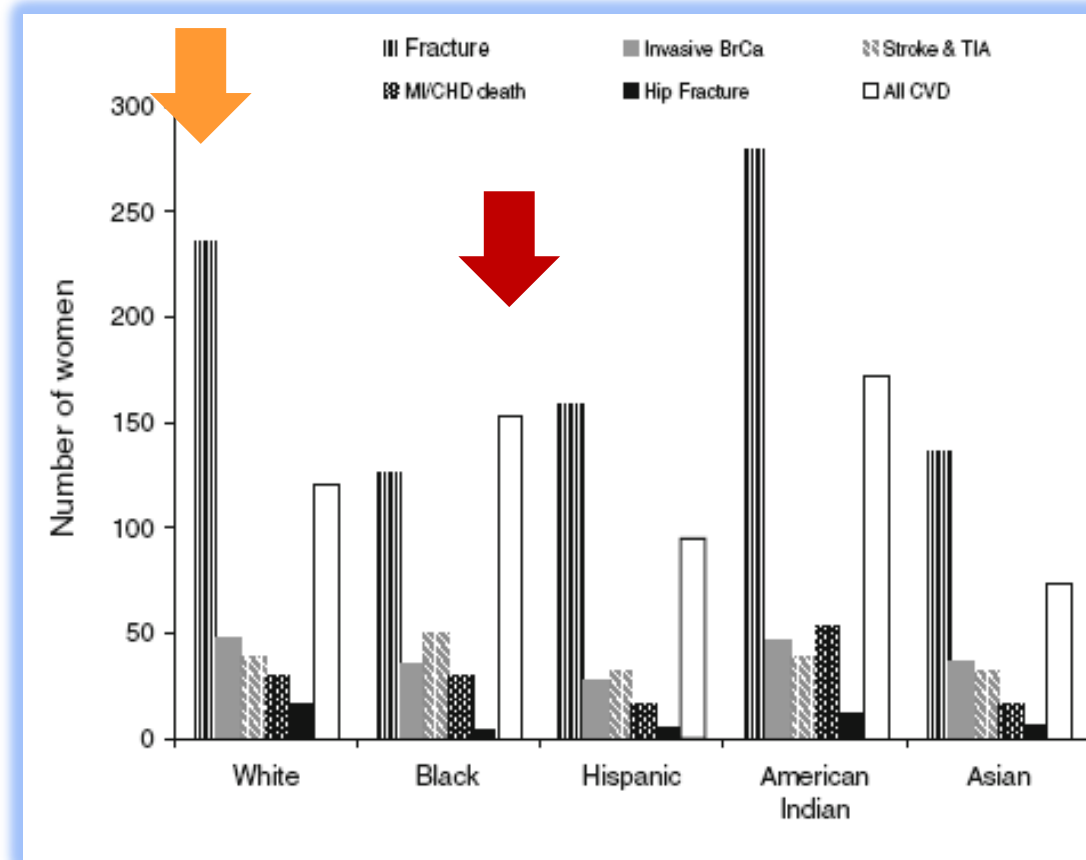
Crude standardized/100,000 people rate of hip fracture in Spain (1997-2010)



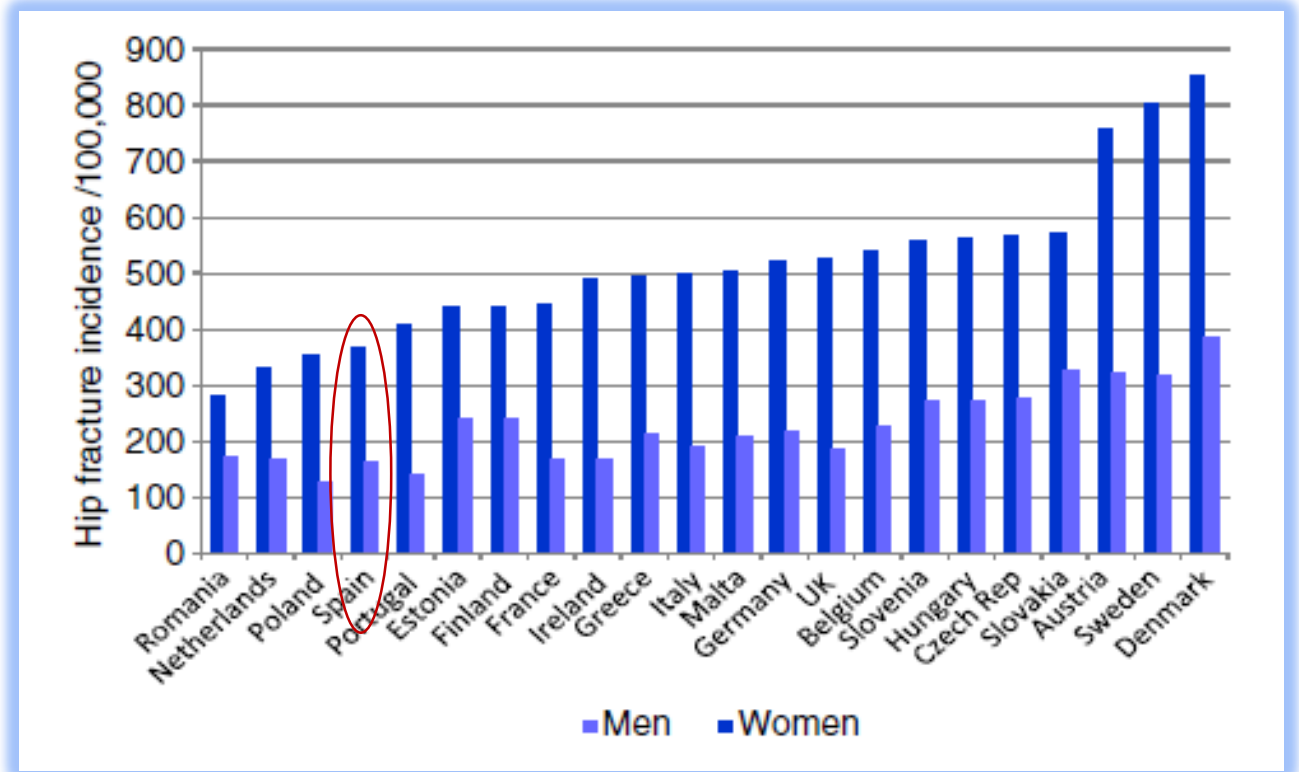
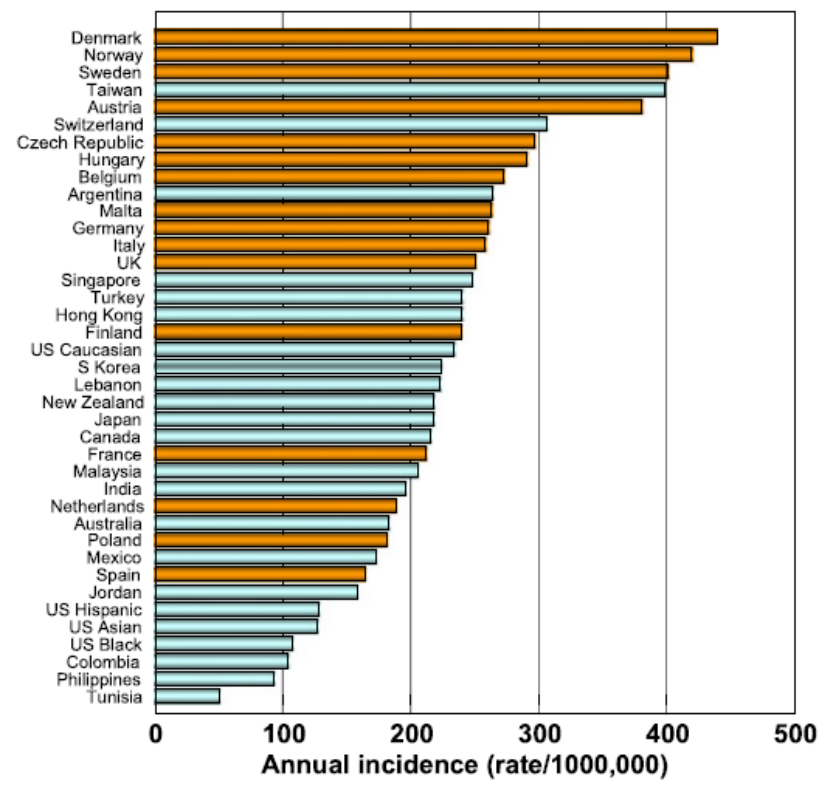


Epidemiología de la Fractura Femoral

Relevancia de las fracturas



Incidencia EU



Kanis. Osteoporos Int 2012;23:2239–2256
Arch Osteoporos 2013; 8:136



Datos en
Catalunya

Incidencia fractura



- Estudio poblacional
- Pacientes ≥ 50 años 2009 (N > 2M)
- Incidencia de fracturas
- Comparación CMBD y cohorte ARTPER (28 centros AP)

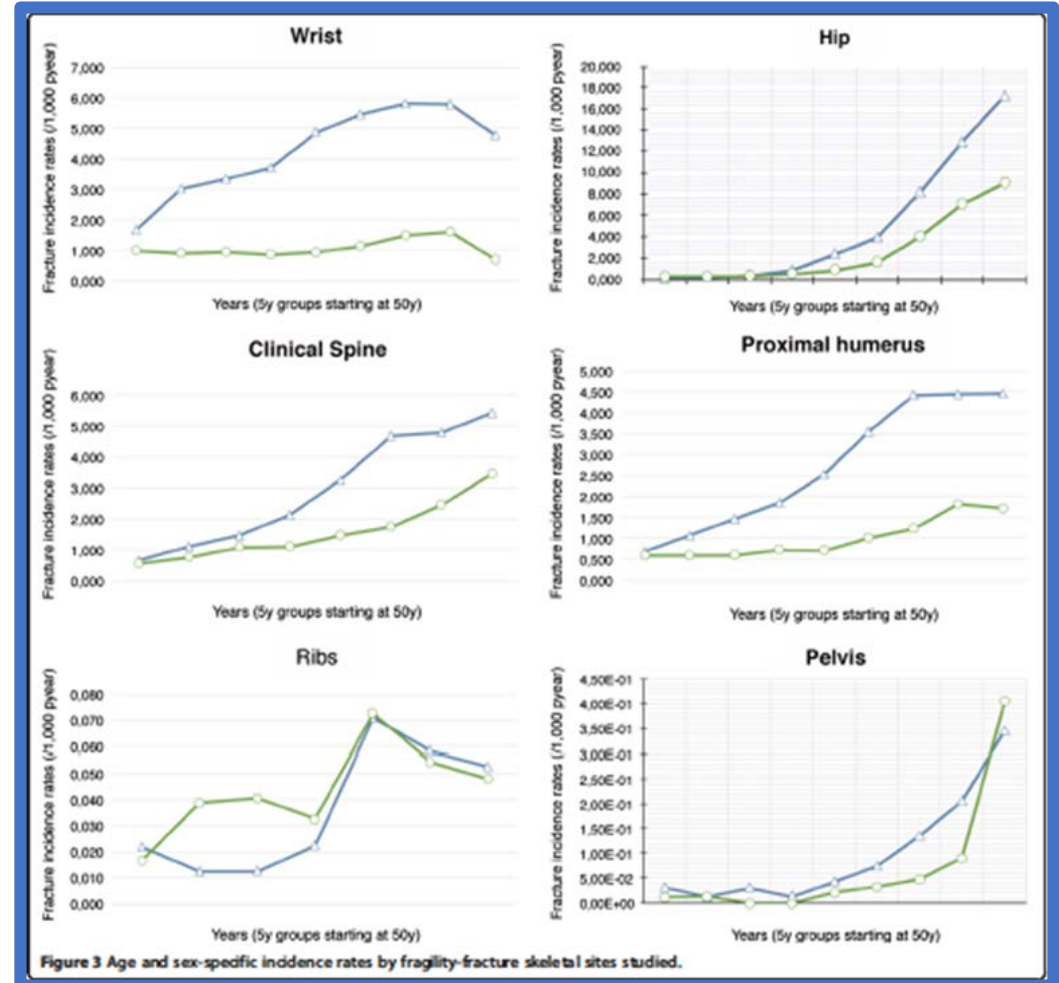
Table 1 Sex- and site-specific fracture incidence rates [and 95% Confidence Intervals] per 1,000 person-years at risk in the SIDIAP population ≥ 50 years old

Skeletal site	Women	Men	Total
Overall	15.18 [15.15–15.21]	5.78 [5.76–5.79]	10.91 [10.89–10.92]
Hip	3.08 [2.97–3.18]	1.23 [1.16–1.30]	2.23 [2.16–2.30]
Wrist/Forearm	3.86 [3.74–3.98]	1.03 [0.97–1.10]	2.56 [2.49–2.63]
Clinical spine	2.59 [2.49–2.69]	1.25 [1.18–1.33]	1.98 [1.91–2.04]
Proximal humerus	2.19 [2.11–2.29]	0.78 [0.73–0.84]	1.55 [1.50–1.61]
Multiple rib	0.03 [0.02–0.05]	0.04 [0.03–0.05]	0.04 [0.03–0.05]
Pelvis	0.06 [0.05–0.08]	0.02 [0.01–0.03]	0.04 [0.03–0.05]

Incidencia fractura



- Estudio poblacional
- Pacientes ≥ 50 años 2009 (N > 2M)
- Incidencia de fracturas
- Comparación CMBD y cohorte ARTPER (28 centros AP)



Incidencia fractura

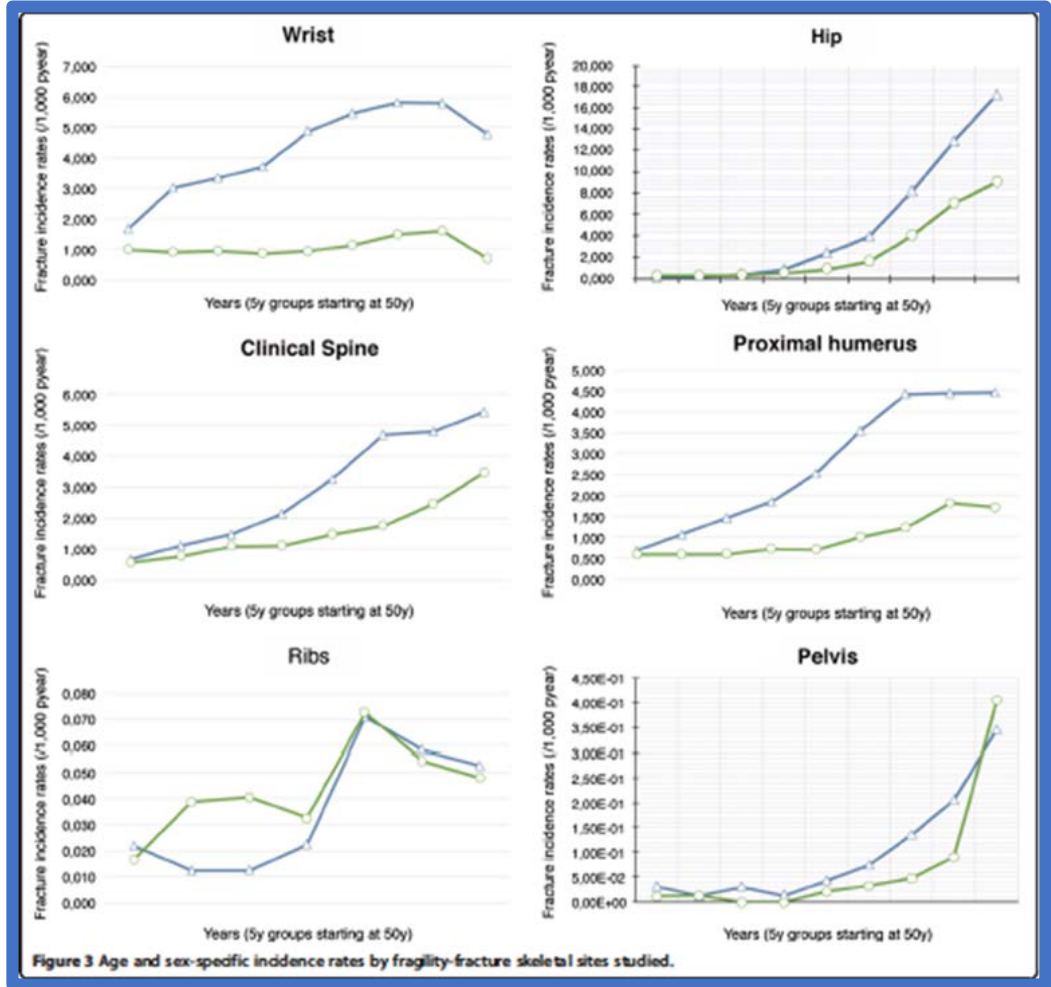
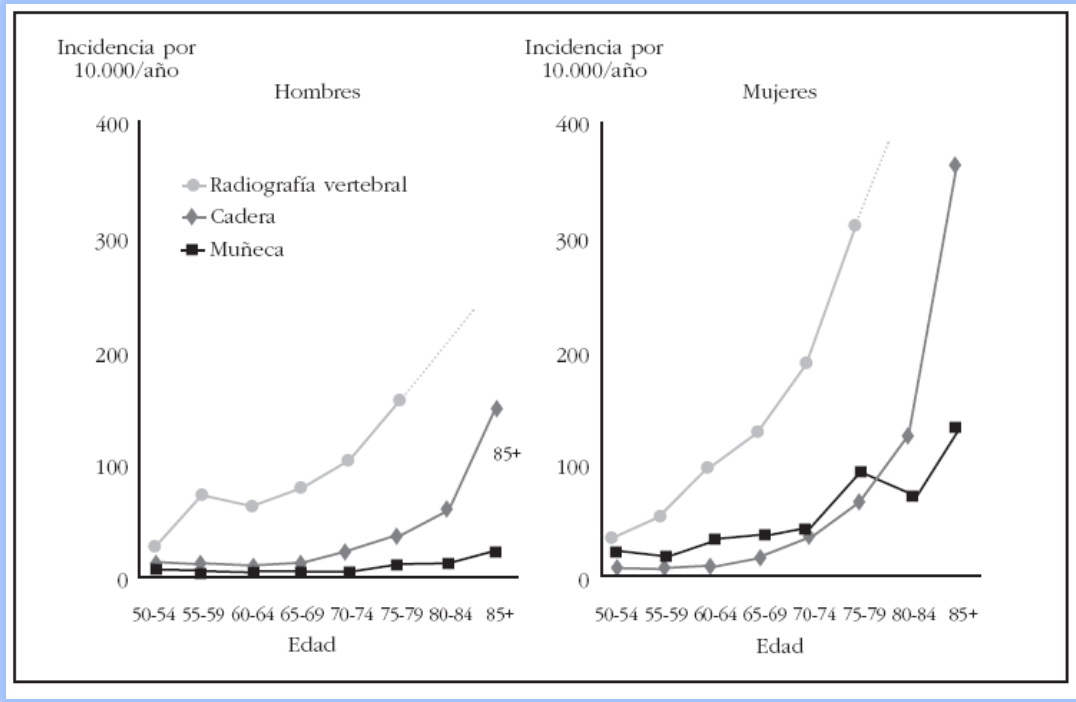


Figure 3 Age and sex-specific incidence rates by fragility-fracture skeletal sites studied.

O'Neill. JBMR 1996;11:1010-8

Pagès-Castellà. BMC Musculoskelet Disord. 2012;13:79

Incidencia fractura



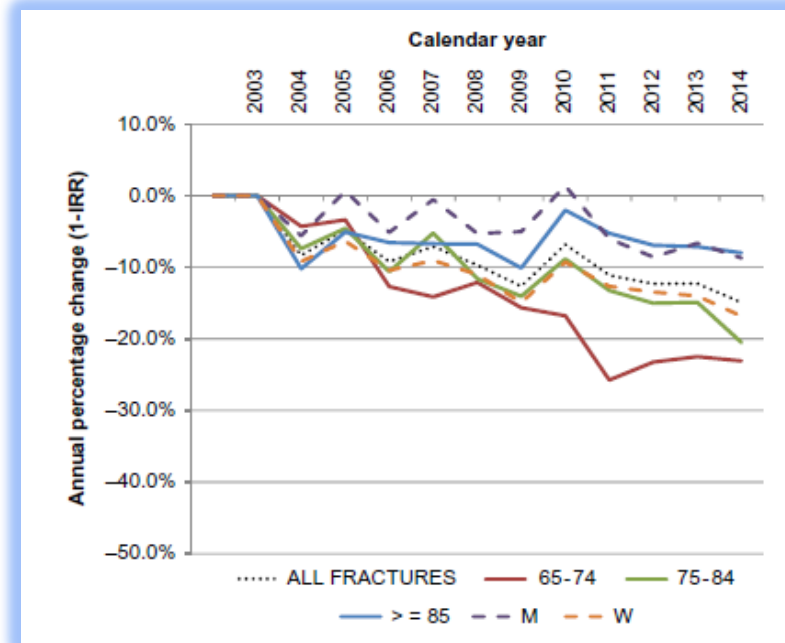
- Estudio poblacional
- Pacientes ≥ 50 años 2009 (N > 2M)
- Incidencia de fracturas
- Comparación CMBD y cohorte ARTPER (28 centros AP)

SKELETAL SITE	Reported in ARTPER	Unreported in ARTPER
WRIST/FOREARM		
Recorded in SIDIAP	32 (82.1%)	7 (17.9%)
Not recorded in SIDIAP	25 (0.7%)	
CLINICAL SPINE		
Recorded in SIDIAP		
Not recorded in SIDIAP		1,591 (99.9%)
HIP		
Recorded in SIDIAP	6 (0.2%)	3,383 (99.8%)
Not recorded in SIDIAP		
PELVIS		
Recorded in SIDIAP	1,194 (70.8%)	492 (29.2%)
Not recorded in SIDIAP	869 (0.01%)	1,119,624 (99.9%)

Sensibilidad: 50-70%
Especificidad: 90-99%

Cambios en la incidencia

- 2003-2014
- Datos CMBD
- Incidencia FF



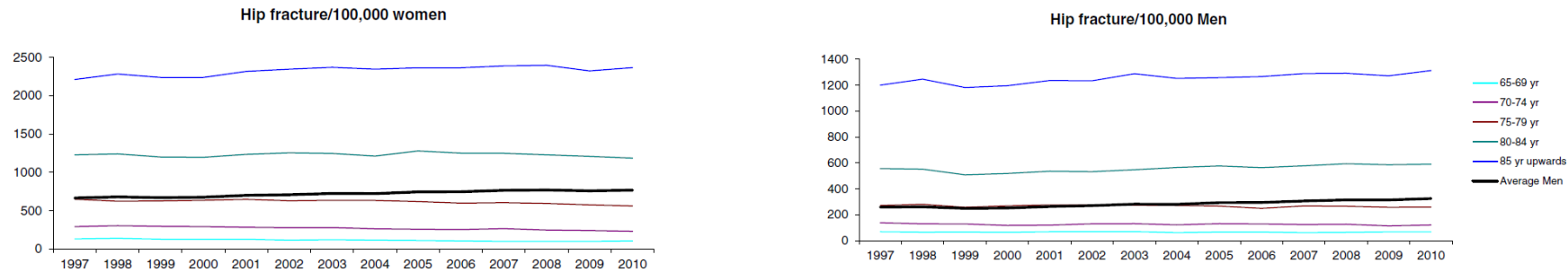
Year	Crude incidence rate ($\times 100,000$)	
	Women	Men
2003	907.2	366.0
95% CI	884.0–930.9	349.0–383.7
2004	850.5	357.3
95% CI	829.1–872.4	340.9–374.4
2005	885.2	385.8
95% CI	863.3–907.6	368.7–403.5
2006	854.8	366.2
95% CI	833.5–876.6	349.8–383.3
2007	880.9	392.3
95% CI	859.3–903.0	375.2–409.9
2008	877.5	381.8
95% CI	856.0–899.5	365.1–399.1
2009	849.8	389.7
95% CI	828.7–871.3	373.0–407.0
2010	911.9	419.8
95% CI	890.2–934.1	402.5–437.6
2011	889.3	395.8
95% CI	867.9–911.1	379.1–412.9
2012	889.7	391.8
95% CI	868.4–911.3	375.4–408.8
2013	888.9	401.3
95% CI	867.7–910.4	384.8–418.3
2014	854.9	390.8
95% CI	834.4–875.9	374.7–407.4
Change (%) between 2003 and 2014	-5.8	6.8



Datos en España

Cambios incidencia FF en España

Tasa bruta FF:

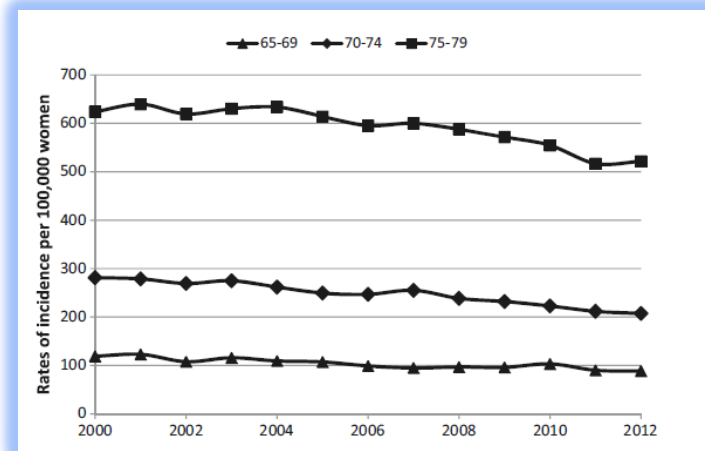


Comparación tasas entre P1 y P2:

	Women					Men				
	Period 1	Period 2	P2 vs P1 (%)	p value	CI 95 %	Period 1	Period 2	P2 vs P1 (%)	p value	CI 95 %
Crude rate Fx per 100,000 p	672.3	764.3	13.7	<0.0001	[12.8–14.6]	255.7	315.3	23.3	<0.0001	[21.5–25.2]
Adjusted rate Fx by age*	722.8	709.2	-1.9	<0.0001	[1.1–2.7]	278.3	288.7	3.7	<0.0001	[2.2–5.3]
Over aging Index (≥75 years/≥65 years)	11.9 %	14.9 %	25.2	<0.0001	[25.7–25.9]	7.3 %	9.5 %	30.1	<0.0001	[30.4–30.7]
Mortality rate adjusted by age	4,279.2	3,322.9	-22.3			5,522.9	4,285.4	-22.4		
Crude rate Fx per 100,000 p by age										
65–69 years	130.7	99.7	-23.7	<0.0001	[20.7–26.8]	66.1	65.6	-0.8	=0.7767	–
70–74 years	295.1	246.0	-16.6	<0.0001	[14.4–18.9]	128.5	121.7	-5.3	<0.05	[1.0–9.3]
75–79 years	632.5	583.8	-7.7	<0.0001	[6.0–9.5]	269.8	262.7	-2.6	=0.127	–
80–84 years	1,215.2	1,216.4	0.1	=0.909	–	533.6	587.2	10.0	<0.0001	[6.7–13.5]
≥85 years	2,241.4	2,366.5	5.6	<0.0001	[4.3–6.9]	1,205.6	1,291.9	7.2	<0.0001	[4.5–9.9]

Cambios incidencia FF en España

Incidencia FF por grupos de edad



Incidencia estandarizada de FF por grupos de edad y comunidad:

	65-69	70-74	75-79	80-84	>85
Andalucia	0.98	0.98	0.98	NS	NS
Aragon	NS	0.98	0.98	NS	NS
Asturias	NS	NS	NS	1.02	1.03
Balearic Islands	NS	1.03	1.04	1.04	1.04
Canary Islands	NS	NS	NS	NS	NS
Cantabria	NS	0.96	0.97	NS	NS
Castille & León	0.97	0.99	0.99	NS	1.02
Castille & Mancha	NS	0.98	0.99	NS	1.01
Cataluña	0.96	0.97	0.97	0.98	0.99
Valencia	0.97	0.97	0.98	NS	NS
Extremadura	NS	NS	NS	NS	1.02
Galicia	NS	NS	NS	1.02	1.02
Madrid	0.96	0.96	0.97	0.98	0.99
Murcia	0.95	0.97	0.98	0.99	0.98
Navarra	0.96	0.95	0.97	0.99	NS
Basque Country	NS	0.96	NS	0.99	NS
La Rioja	NS	0.96	NS	NS	NS
Ceuta	NS	NS	NS	NS	NS
Melilla	NS	NS	1.19	1.09	1.17
España	0.976	0.975	0.983	0.995	1.004

NS not significant statistically for a $p < 5\%$

Diferencias regionales

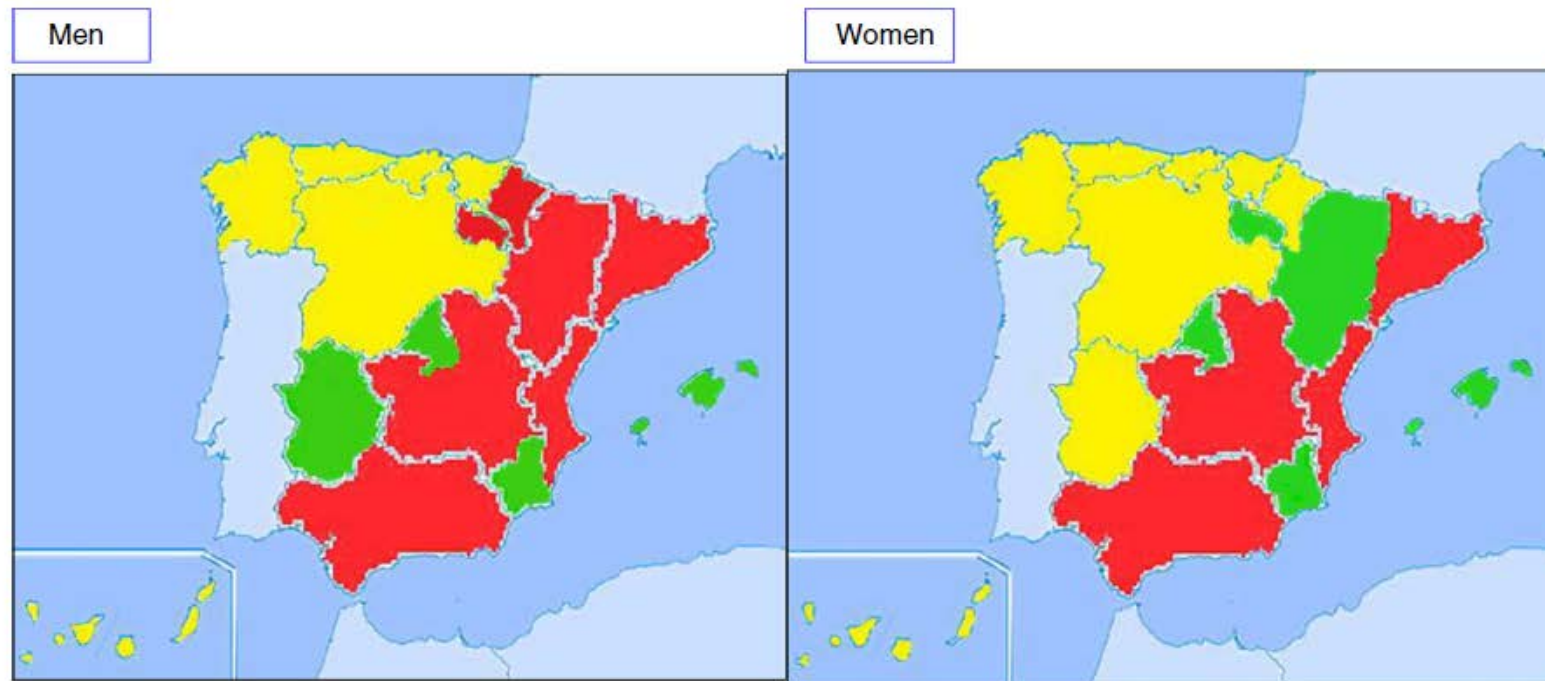
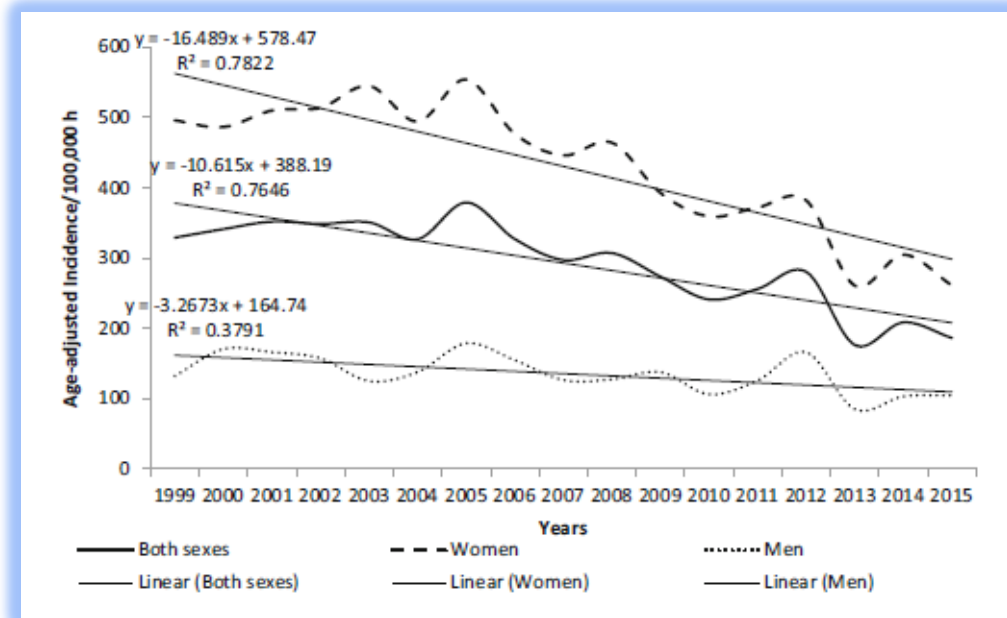


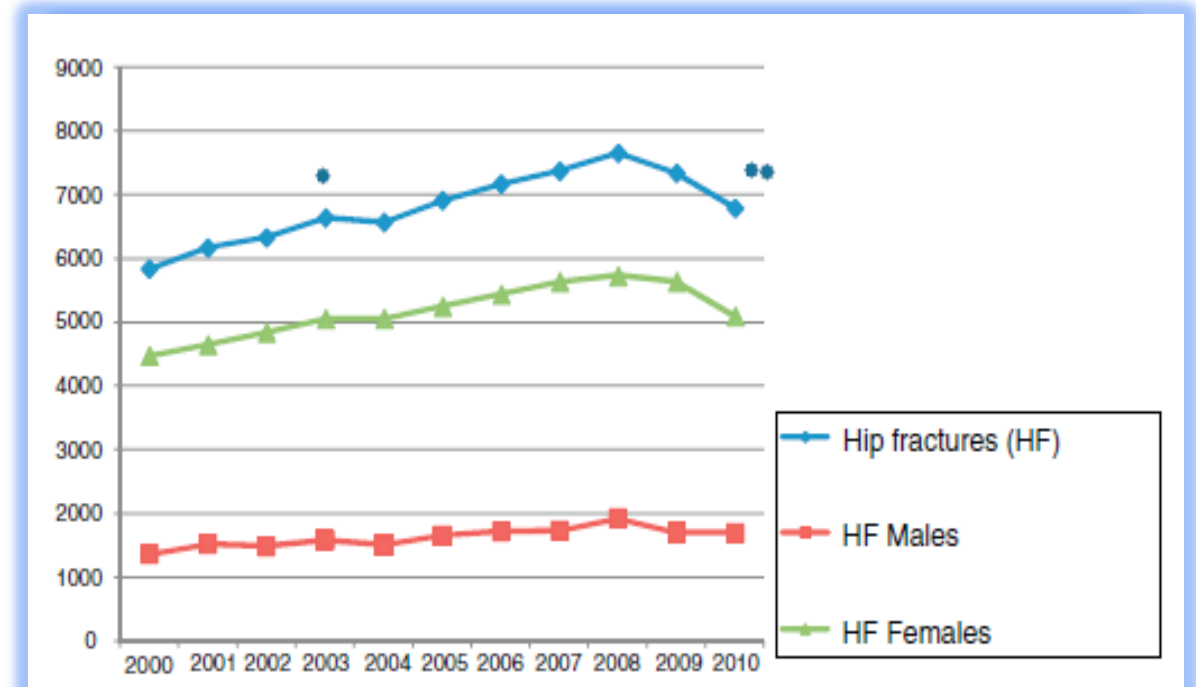
Fig. 1. Map of the variability in the incidence rate of hip fracture adjusted for women (left) and men (right) in the 17 autonomous regions of Spain, depending on the ratio compared to the national average. Red: high incidence, ratio > 1; green: medium incidence, ratio = 1; yellow: low incidence, ratio < 1.

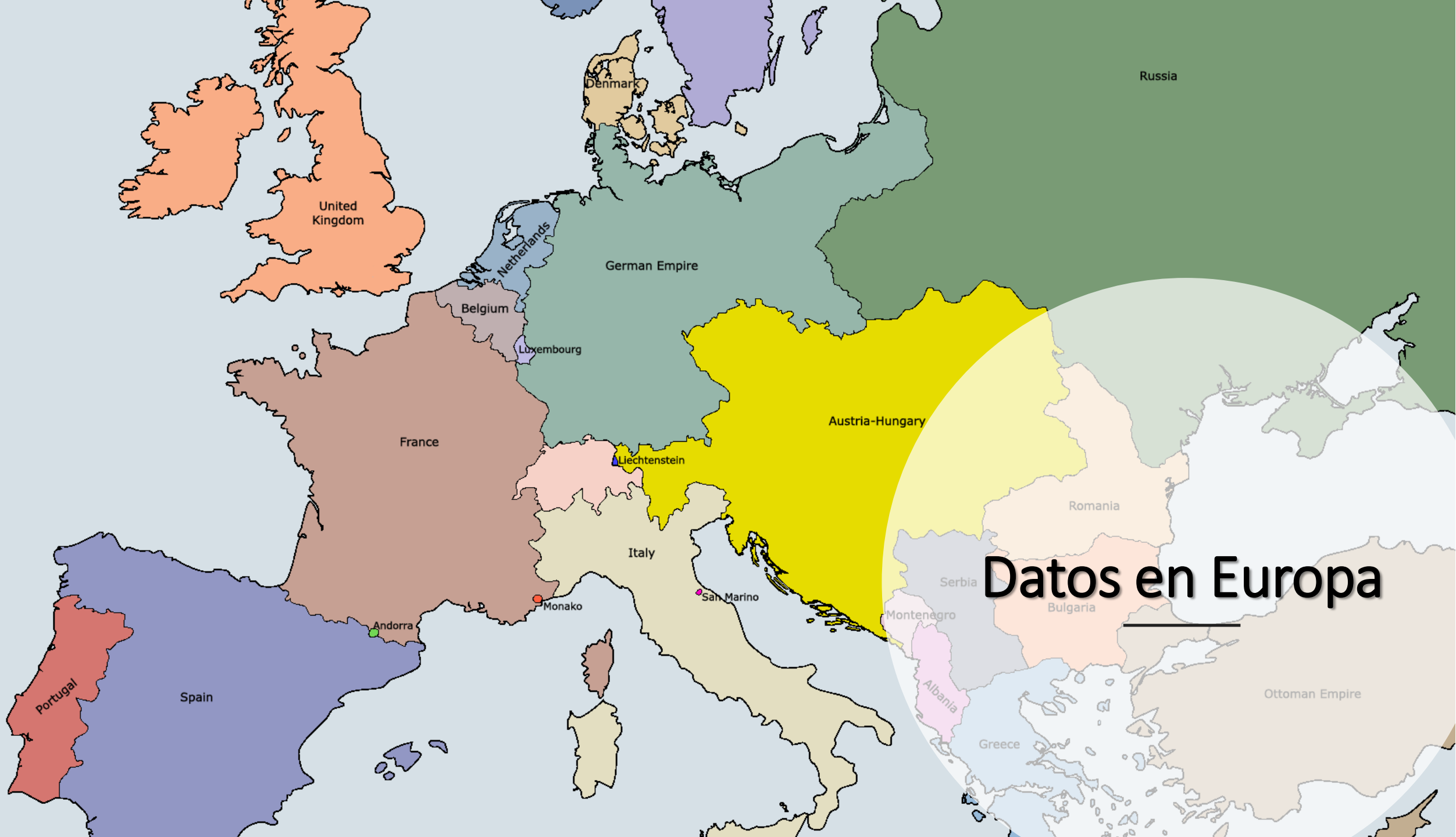
Otros estudios cambios incidencia España

Tendencias seculares incidencia FF Alcorcón (1999-2015)



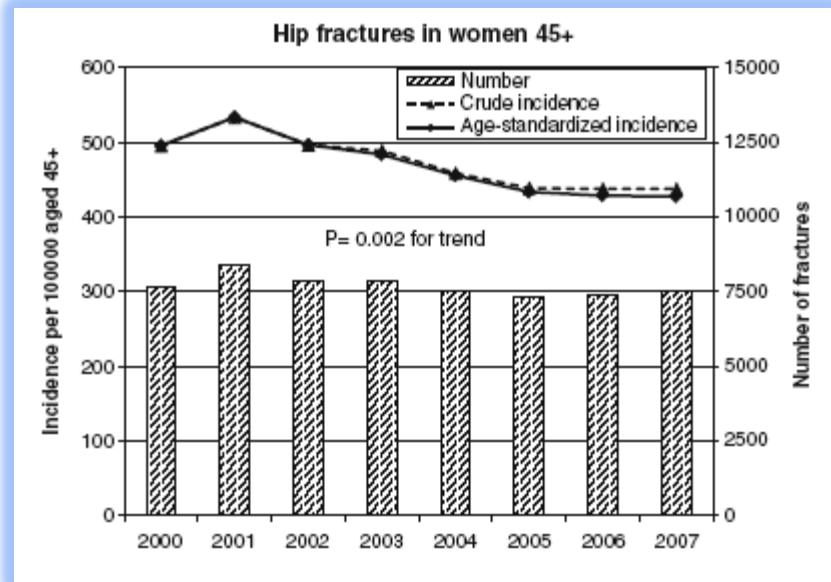
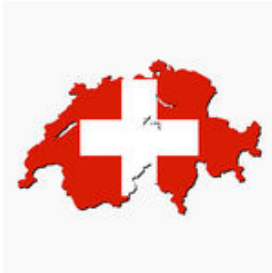
Incidencia FF y FT Andalucía (2000-2010)



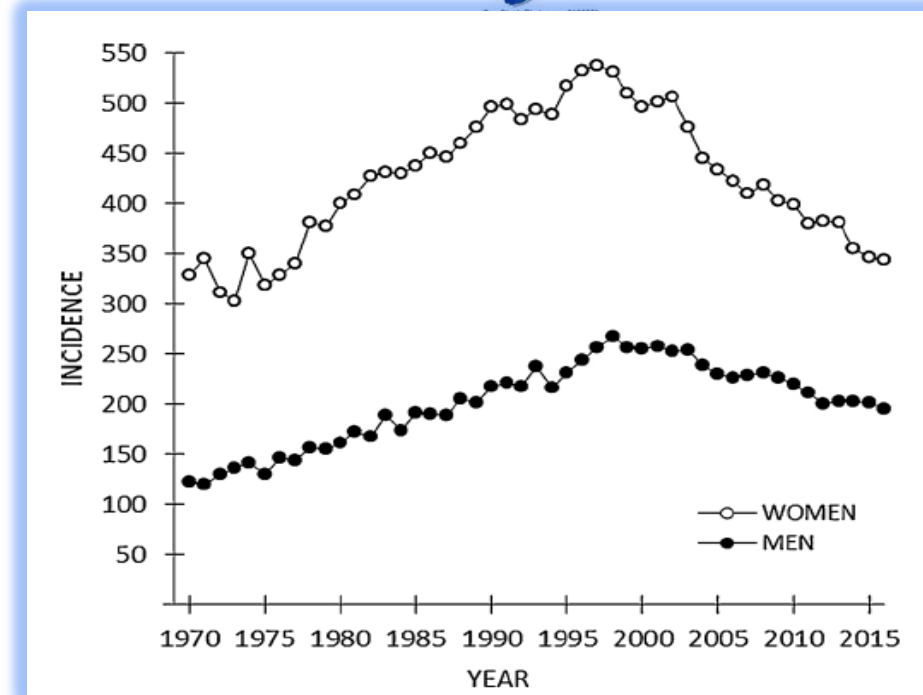


Datos en Europa

Cambios incidencia FF Suiza y Finlandia



Lippuner et al. Osteoporos Int 2011;22:2487-97

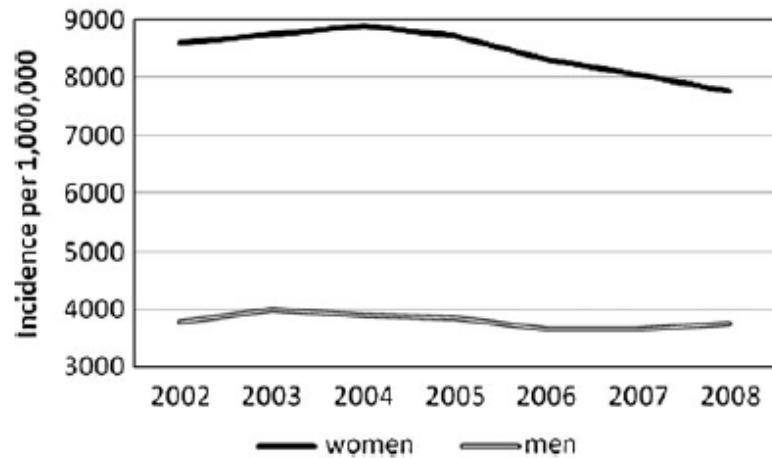


Kanus et al. Arch Gerontol Geriatr. 2018;77:64-67

Cambios incidencia FF en Francia



Evolution of the incidence of hip fracture in age-class 75-84 years from 2002 to 2008



Maravic et al. *Osteoporos Int* 2011;22:797-801

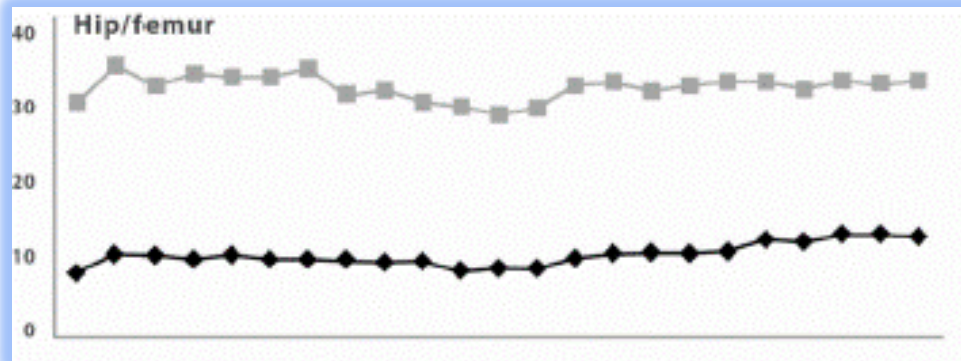


Garofoli et al. *Osteoporos Int* 2019;30:355-62

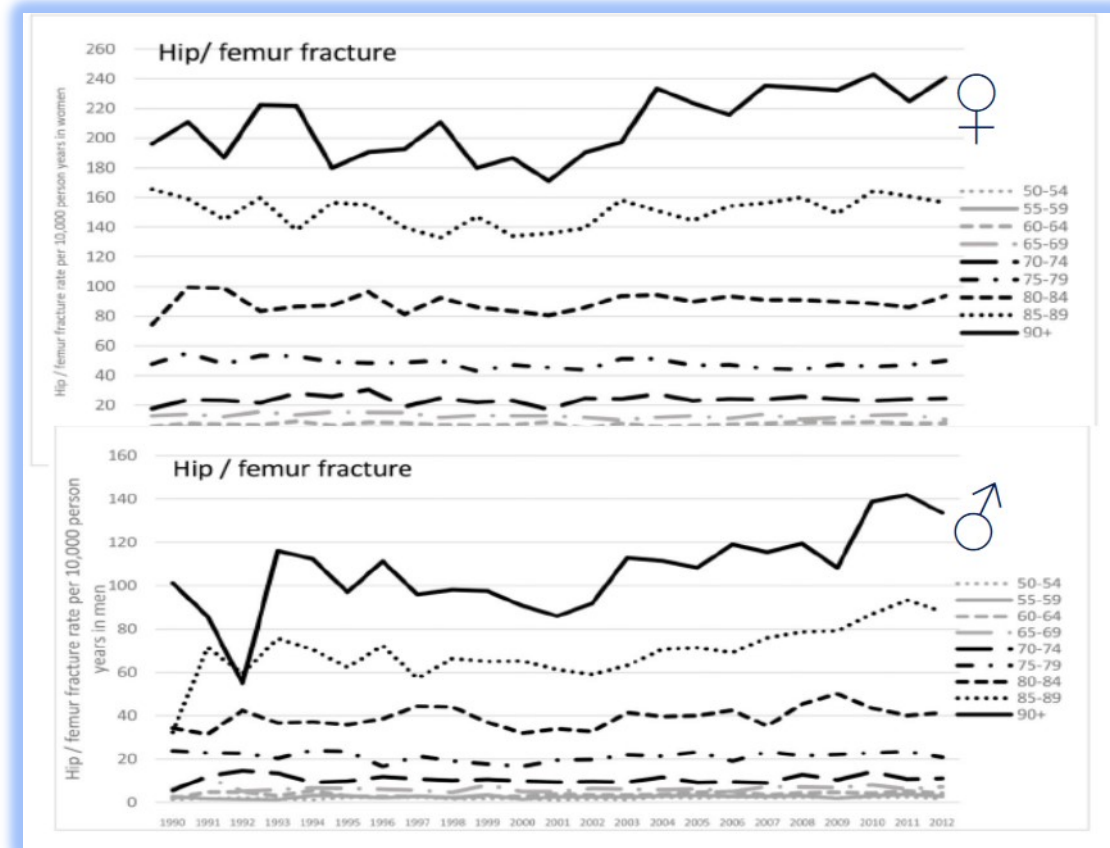
Cambios incidencia FF en UK



Incidencia FF (10.000 py) según sexo:



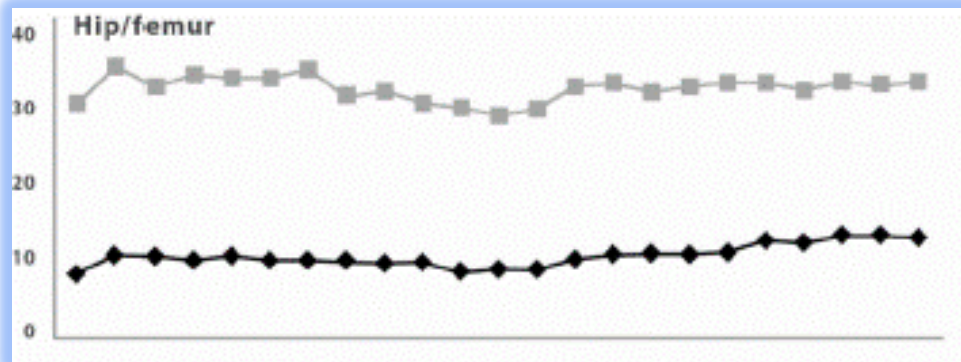
Incidencia FF (10.000 py) según edad:



Cambios incidencia FF en UK



Incidencia FF (10.000 py) según sexo:

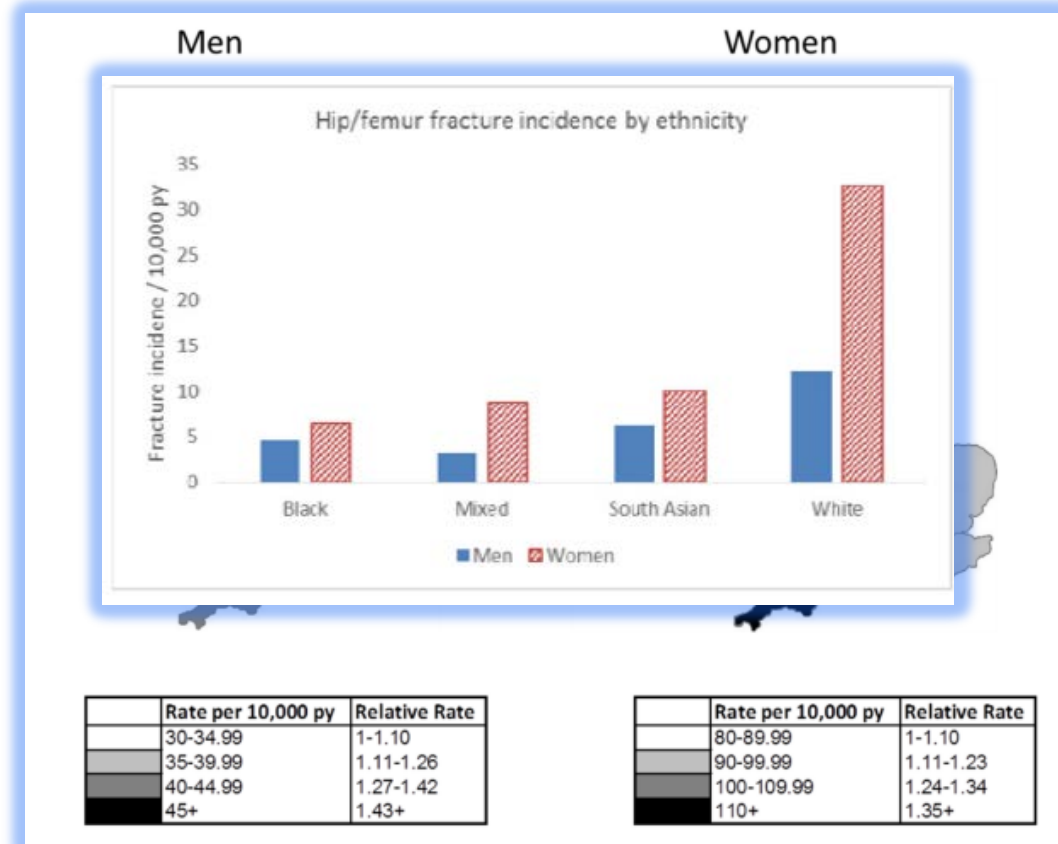


Van der Velde et al. *Osteoporos Int* 2016;27:3197-206

Curtis et al. *Bone* 2016;87:19-26

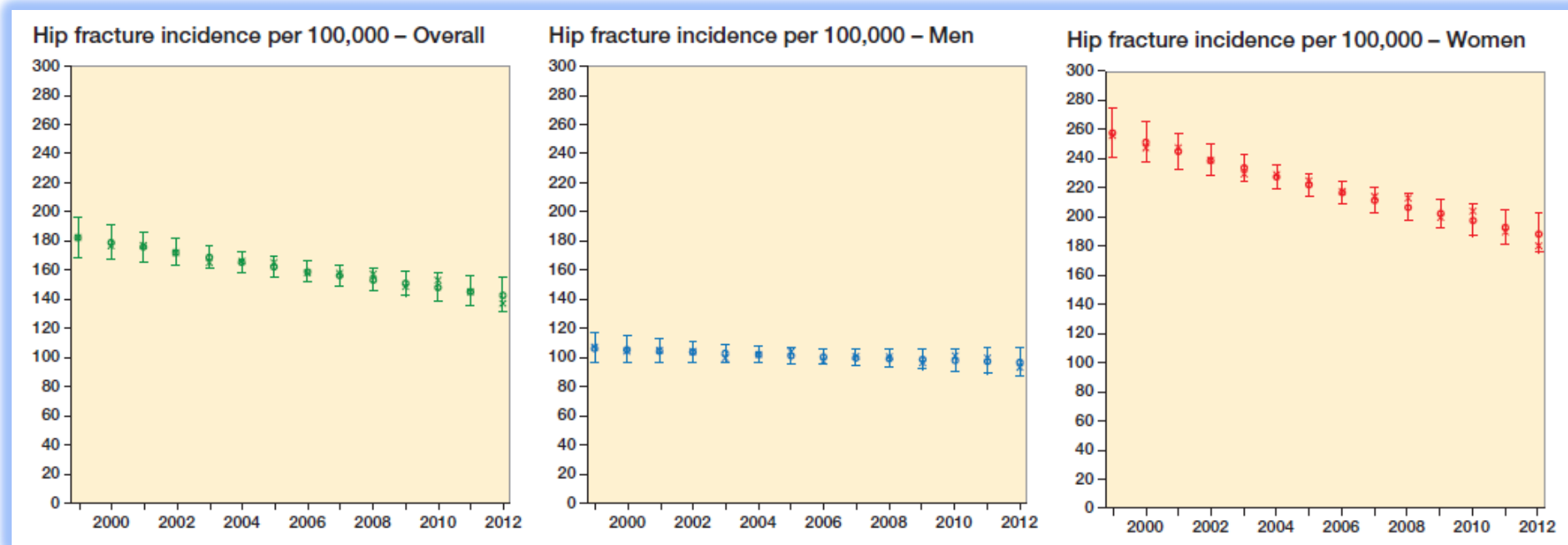
Curtis et al. *Bone* 2017;104:29-38

Diferencias regionales incidencia:



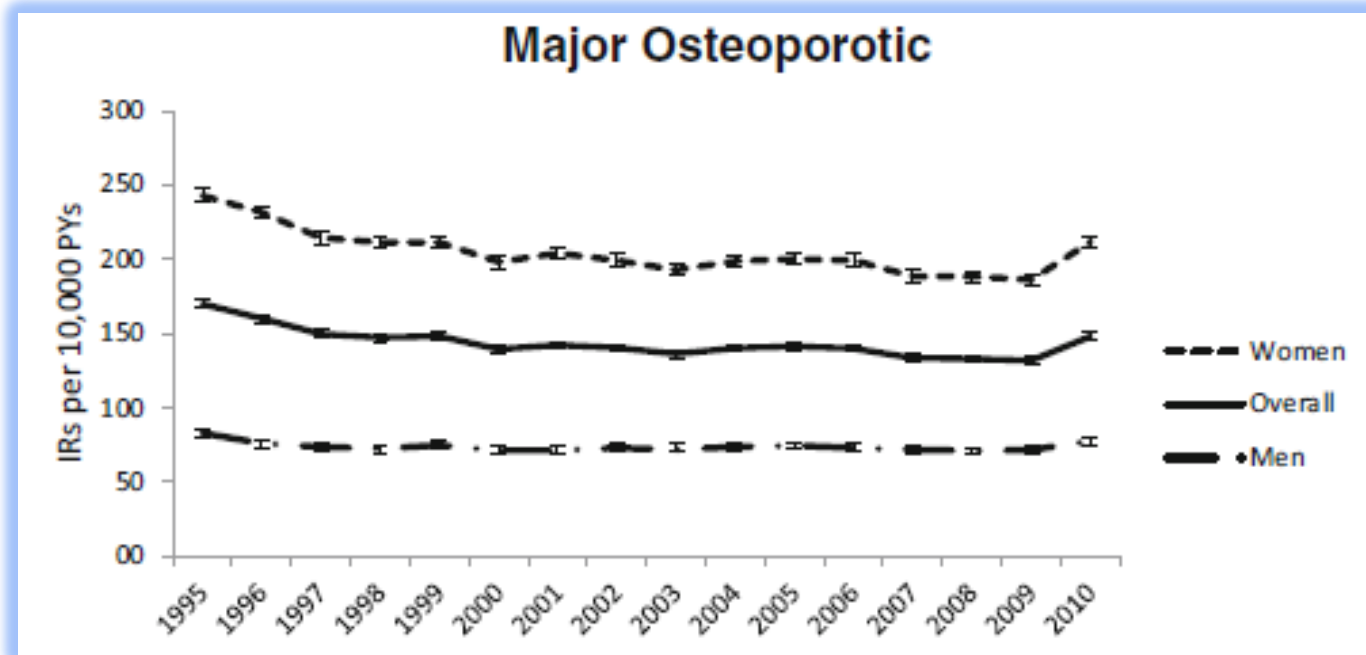
Cambios incidencia fractura en Dinamarca

Incidencia FF (100.000 py) según sexo:



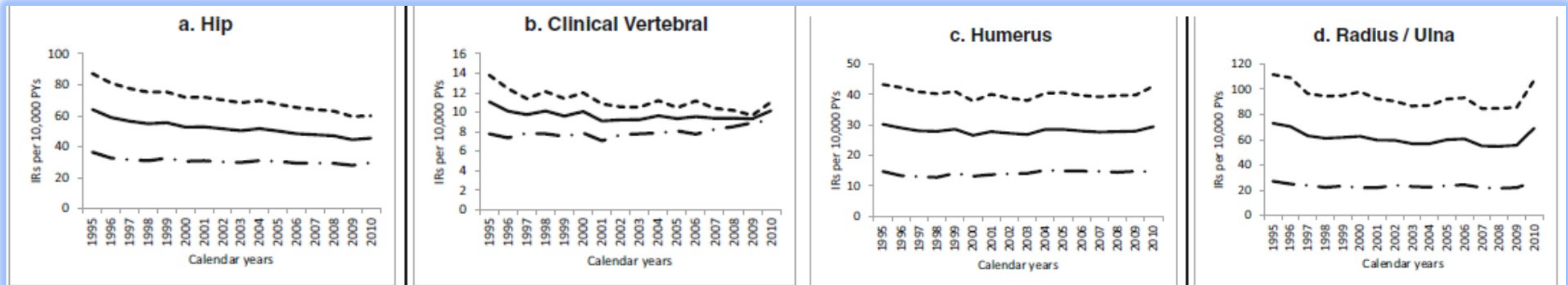
Cambios incidencia fractura en Dinamarca

Incidencia fracturas principales (100.000 py) :



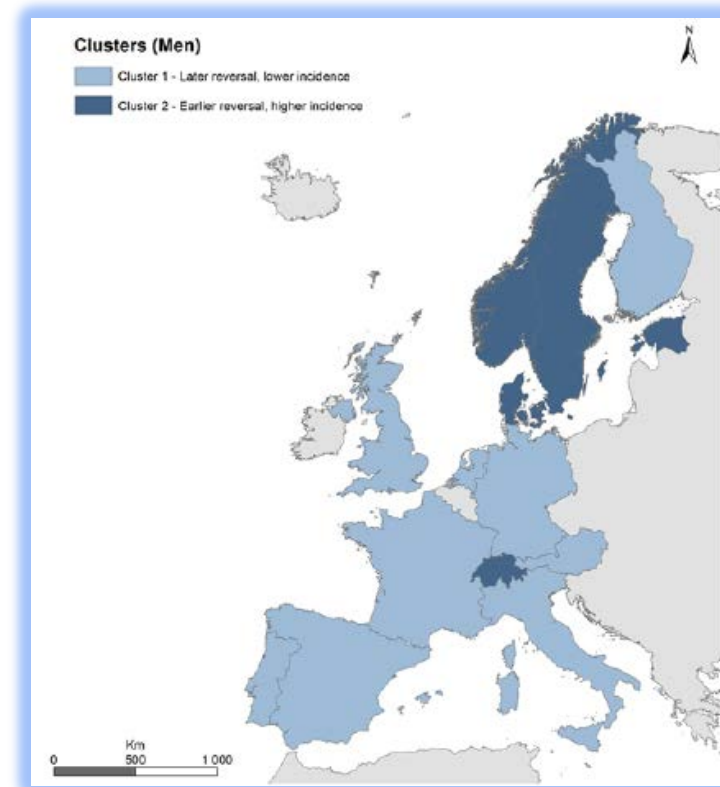
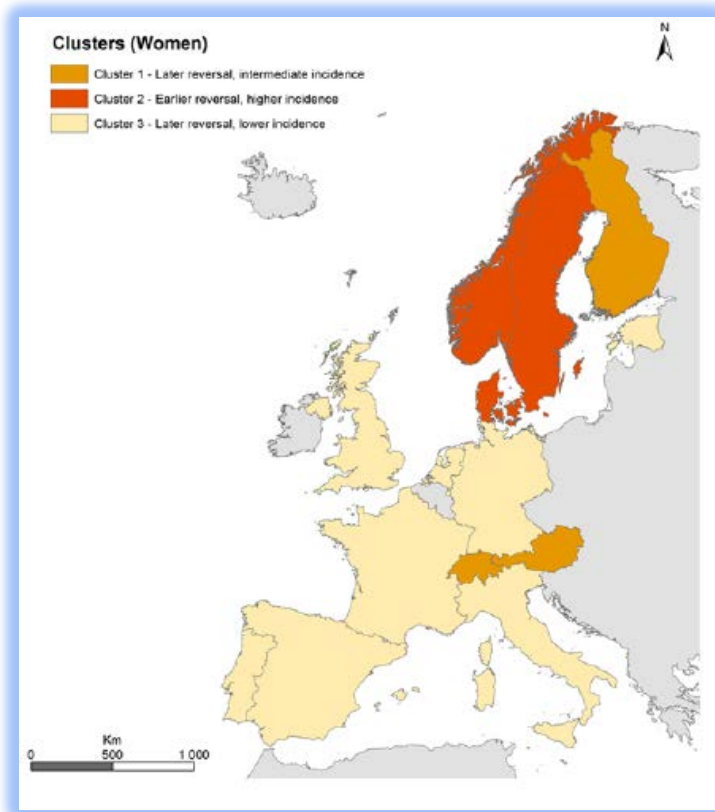
Cambios incidencia fractura en Dinamarca

Incidencia fracturas principales (100.000 py) :



--- Women
— Overall
- · - Men

Tipo de países EU

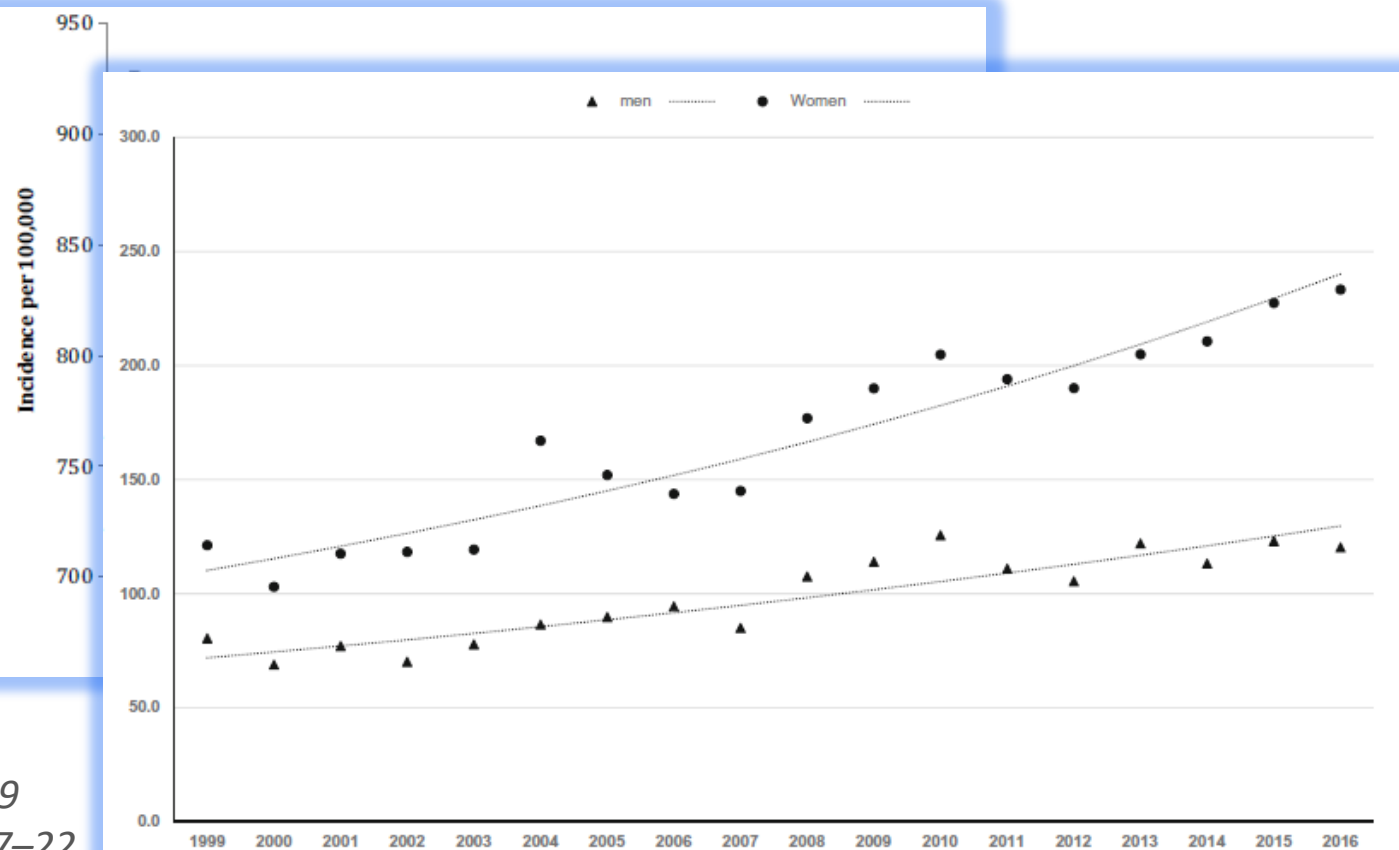


Otros datos cambios seculares



Table 2 Standardized rate over 100 0

	2006	2007
Cases	2336	2146
Overall rate	175.9	161.6



2015
2381
179.3

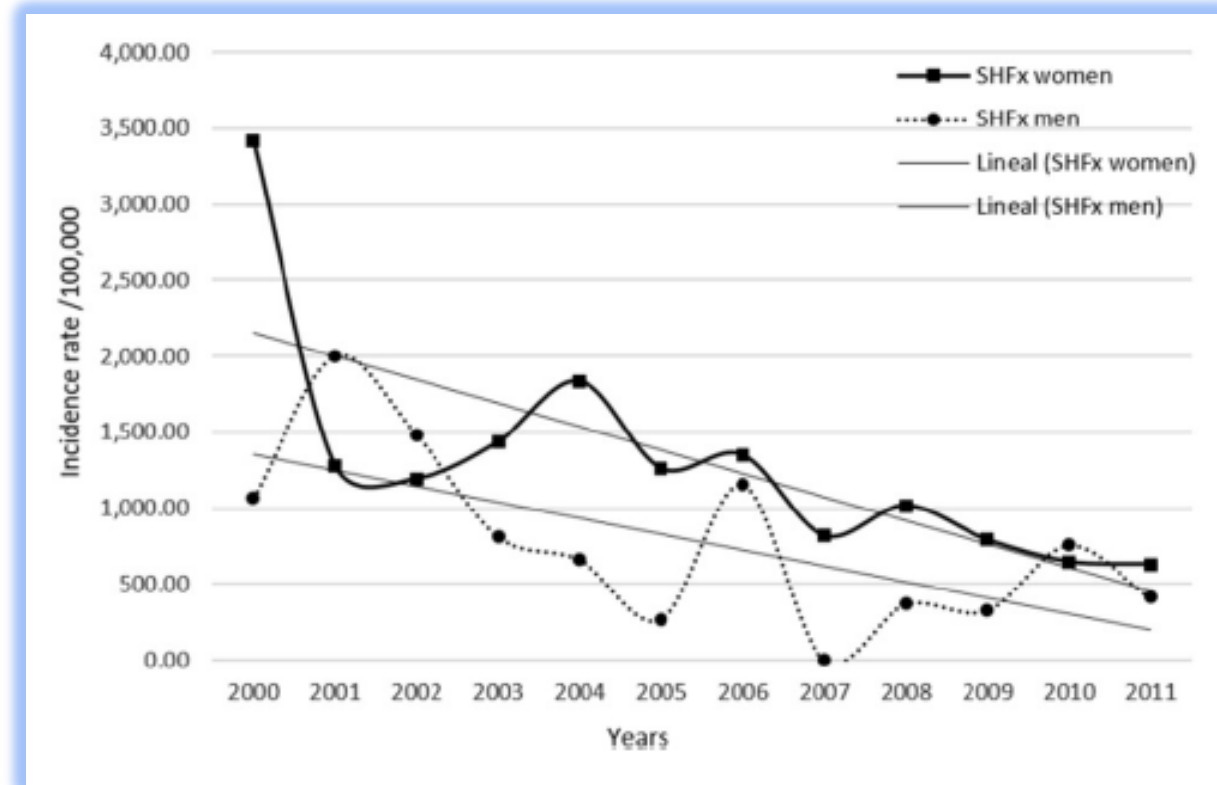
Di Giovanni et al. *Geriatr Gerontol Int* 2019
 Lewiecki et al. *Osteoporos Int* 2018;29:717–22
 Orces et al. *Archives of Osteoporosis* 2017;12: 109

An abstract graphic featuring a thick, flowing red ribbon that loops and curves across the frame. The ribbon has a slight gradient and is set against a white background. On the right side, there is a semi-transparent circular area containing text.

Segunda Fractura

Cambios en la incidencia segunda FF

- 1999-2011
- Alcorcón
- Incidencia segunda FF



Incidencia segunda fractura

- 1990-2012
- CPRD
- Incidencia segunda fractura, según previa



Index fracture	Subsequent fracture					
	Hip/femur	Vertebra	Humerus	Radius/ulna	Pelvis	Rib
Hip/femur		41.7	59.5	37.8	33.5	24.4
Vertebra	70.7		44.0	25.9	18.8	47.3
Humerus	68.7	25.6		71.3	9.1	20.7
Radius/ulna	38.5	3.5	59.3		7.2	17.9
Pelvis	139.2	49.4	71.7	37.1		38.2
Rib	32.7	30.3	24.4	27.7	7.0	a

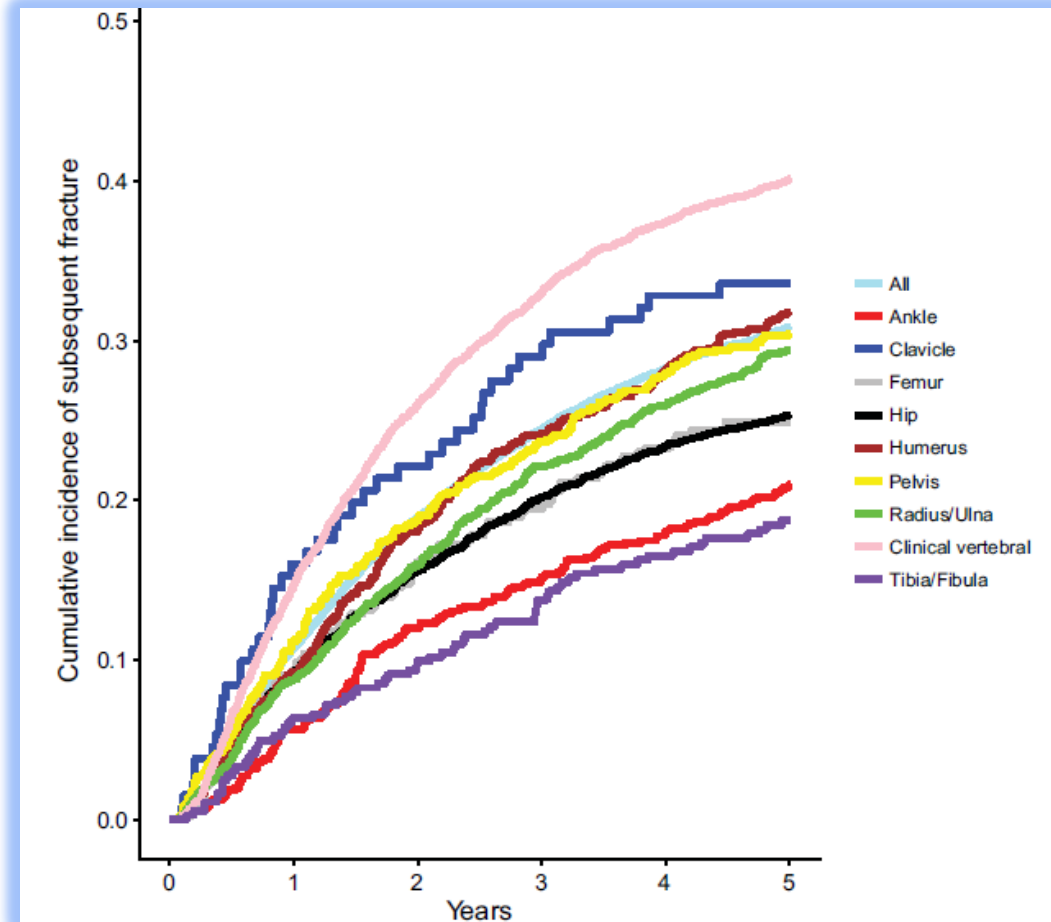
^a The number of fractures was too few to calculate meaningful incidence rates



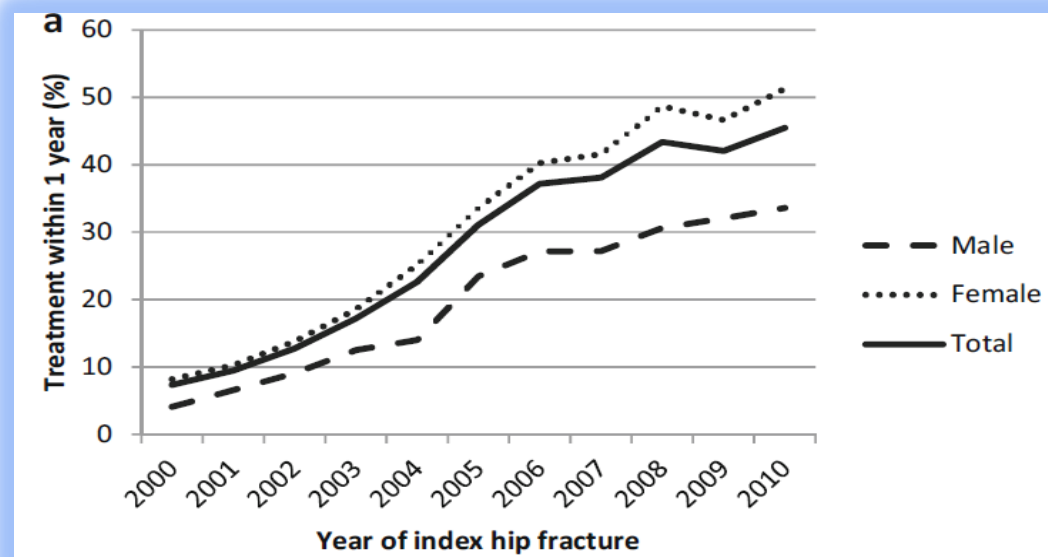
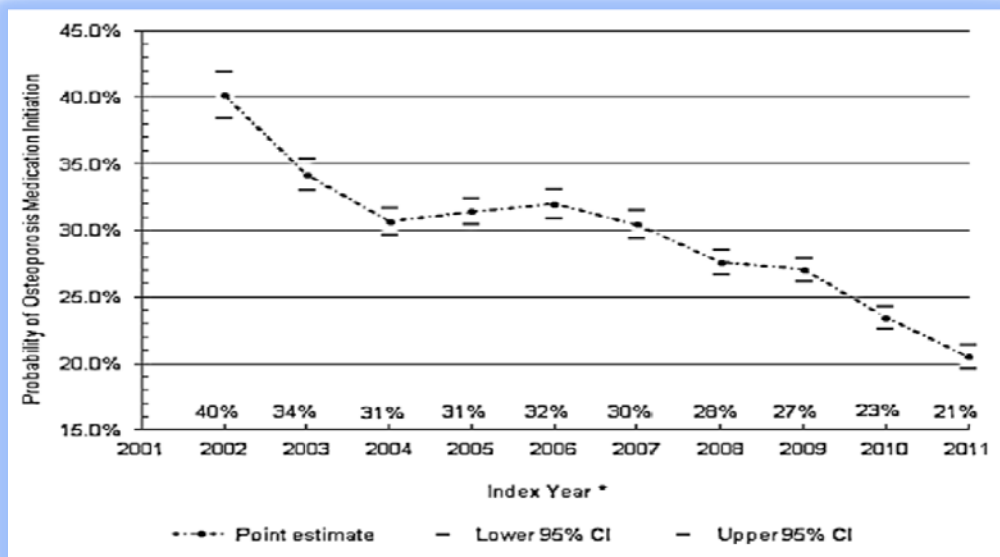
Index fracture	Subsequent fracture					
	Hip/femur	Vertebra	Humerus	Radius/ulna	Pelvis	Rib
Hip/femur		44.5	88.2	117.2	62.2	19.1
Vertebra	154.8		71.8	93.4	58.6	37.9
Humerus	116.5	36.3		154.9	29.5	16.0
Radius/ulna	82.4	27.4	80.1		19.4	14.9
Pelvis	264.3	74.4	107.3	144.9		32.1
Rib	87.2	55.2	63.0	96.5	26.7	a

^a The number of fractures was too few to calculate meaningful incidence rates

Riesgo inminente



Prevención segunda fractura



Solomon et al. *J Bone Miner Res* 2014;29:1929-37

Klop et al. *Osteoporos Int* 2015; 26:1919-28

Brecha tratamiento

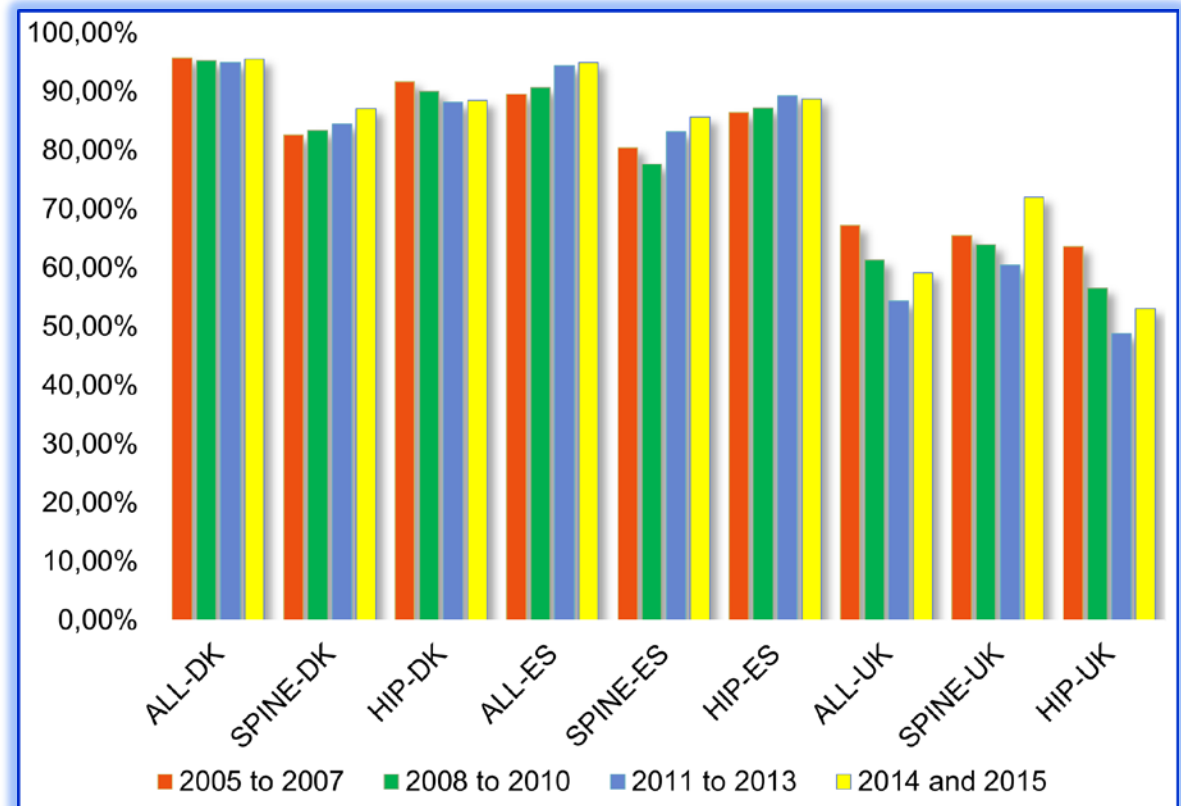


SIDIAP



CPRD

- Estudio cohortes
- SIDIAP, CPRD y DHR
- ≥ 50 años con fractura incidente 2005-2015
- Exclusión cáncer de próstata, mama o hueso y usuarios FPO en el año previo a la fractura.





**Mortalidad post-
fractura**

Tasas de mortalidad (por 1000 personas/año):

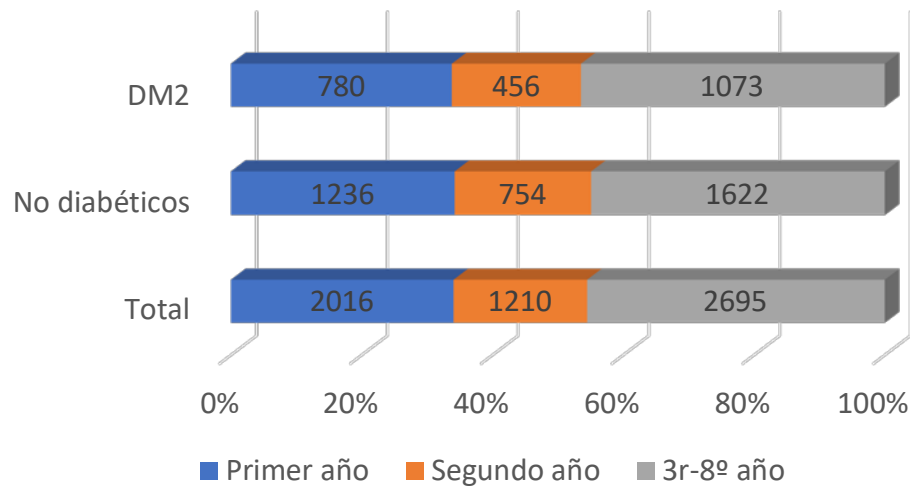


	Total
Alguna fractura (AF)	
Número casos	5.921
Tasa mortalidad (IC 95%)	53,93 (52,57 – 55,32)
No fractura	
Número casos	60.274
Tasas mortalidad (IC 95%)	8,86 (8,79 – 8,93)
Fractura fémur (FF)	
Número casos	3.511
Tasa mortalidad (IC 95%)	119,23 (115,36 -123,24)
No fractura fémur	
Número casos	62.685
Tasa mortalidad (IC 95%)	8,76 (8,69 – 8,83)

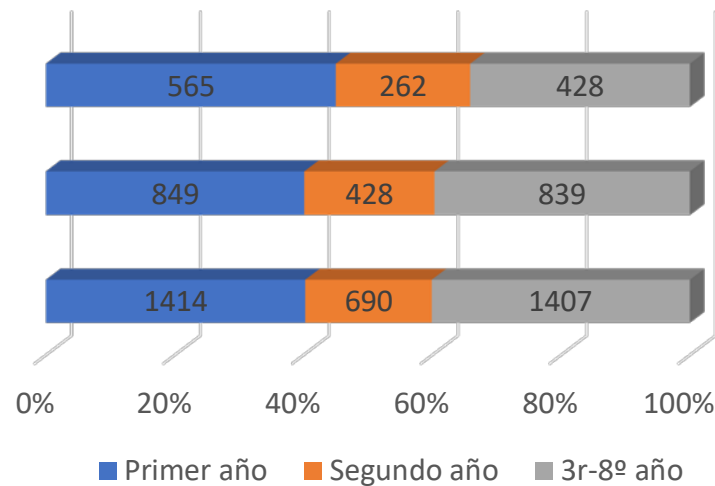
N muertes año tras fractura:



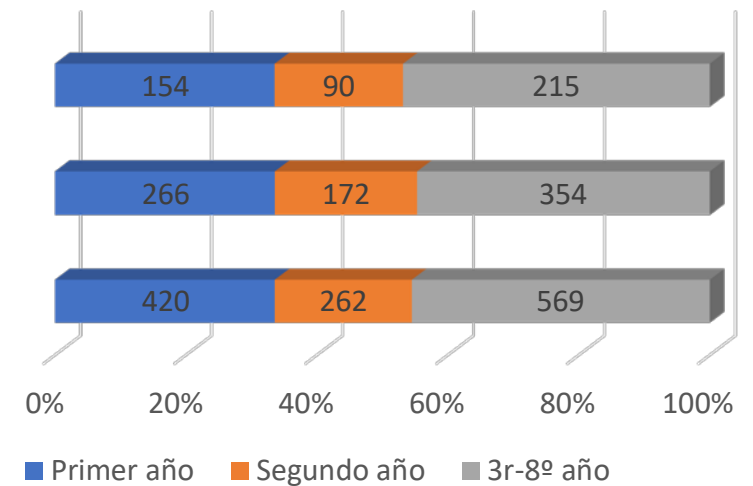
Tras Alguna Fractura



Tras Fractura Fémur

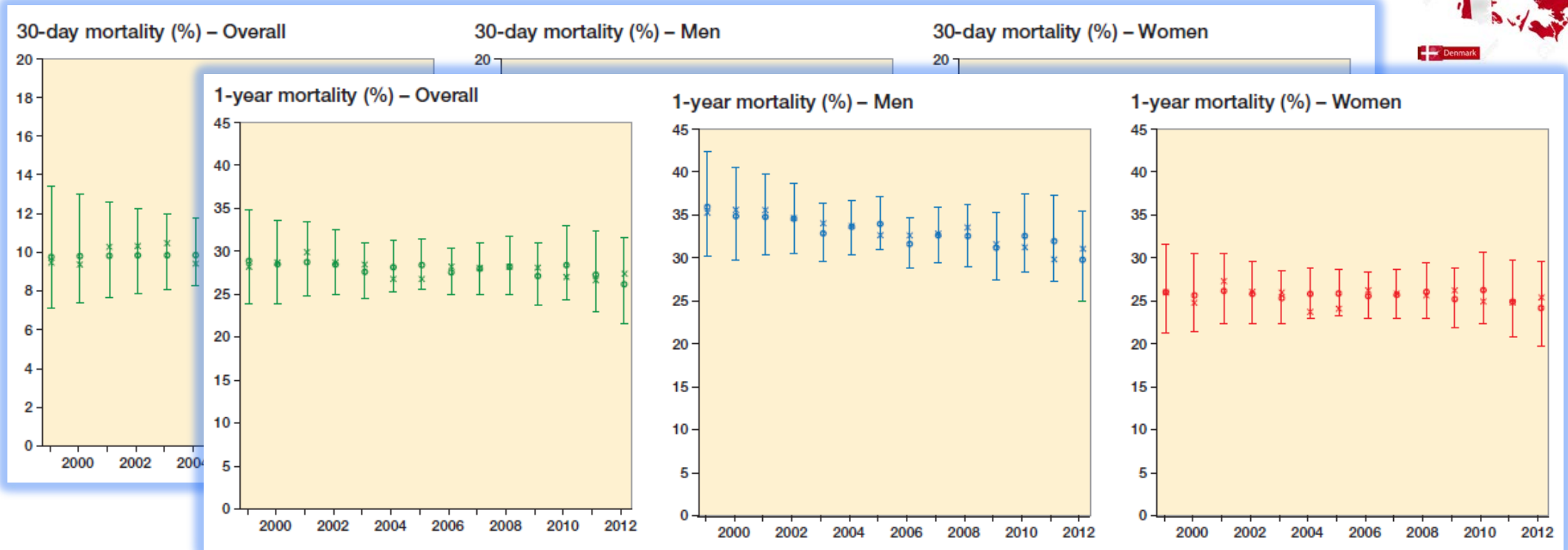


Tras Fractura Vertebral

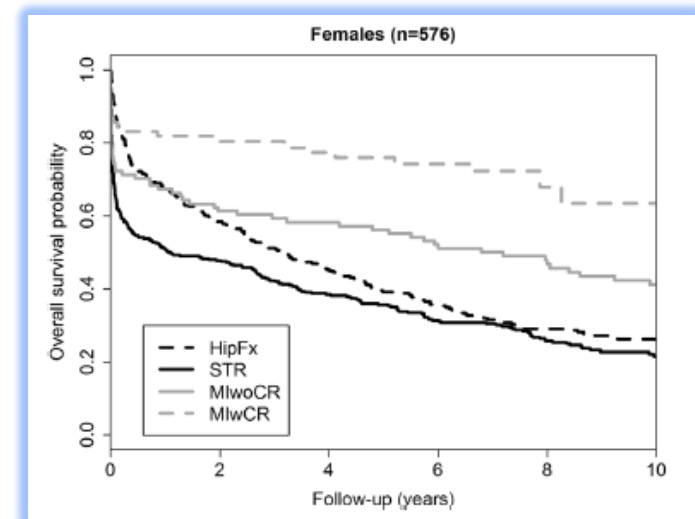
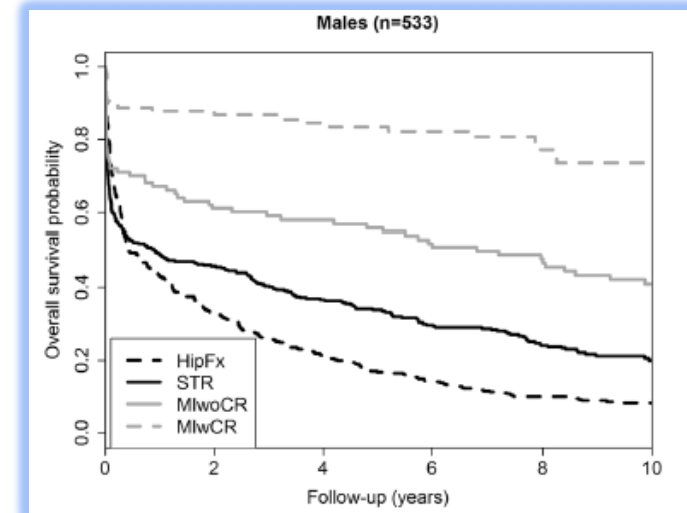
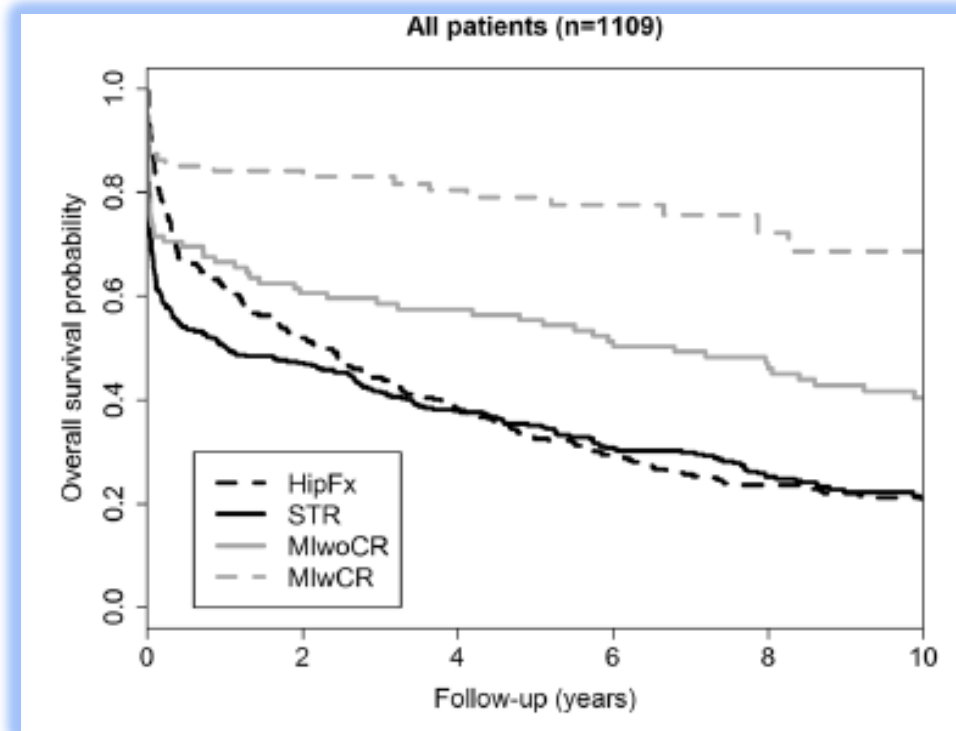


Cambios incidencia fractura en Dinamarca

Mortalidad a los 30 días y al año post FF:



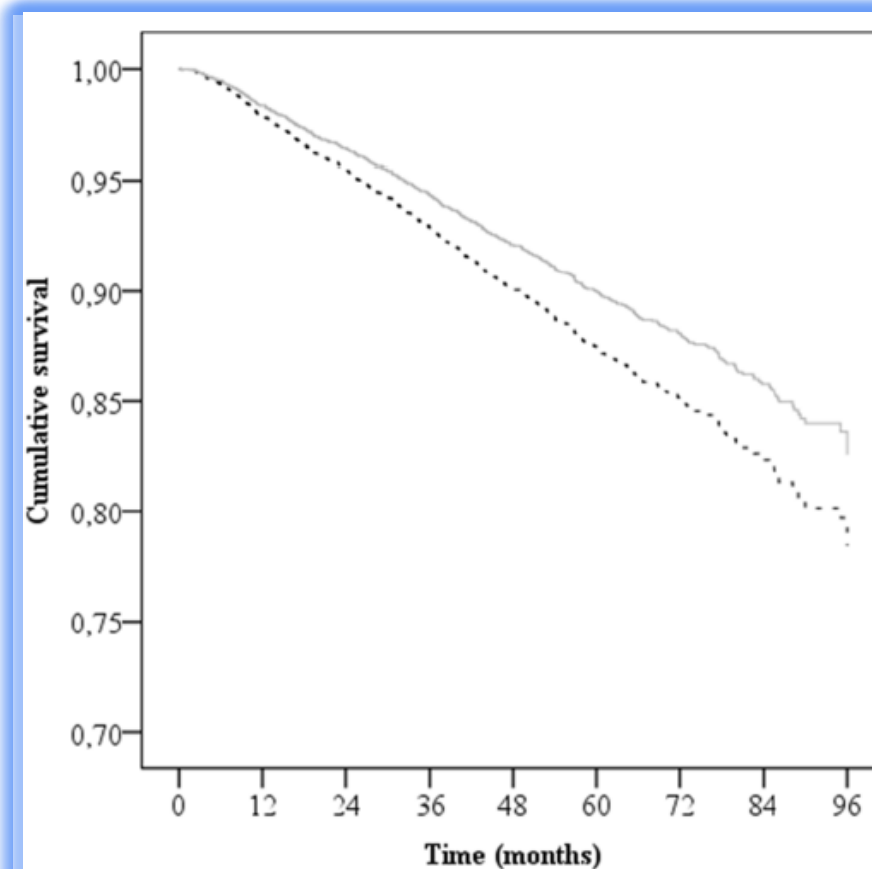
Muerte post FF vs AVC - IAM



Mejorando la mortalidad post FF

Table 3. Predictors of mortality. Multivariable Cox regression model; values are presented as hazard ratio's (HR) with 95% confidence intervals (95%CI).

Mortality	HR (95%CI)	p-value
Gender (women)	0.55 (0.46–0.67)	<0.001
Increasing age (per 5 years)	1.42 (1.35–1.49)	<0.001
Worse T-score (per 0.5 SD) ^a	1.10 (1.05–1.15)	<0.001
Initial fracture ^b		
Hip	1.46 (1.19–1.81)	<0.001
Major	1.30 (1.07–1.58)	0.008
Minor	Reference	
Alcohol intake \geq 5 units/day	1.70 (1.31–2.20)	<0.001
Smoking	1.82 (1.51–2.19)	<0.001
Past or current GC use ^c	1.87 (1.23–2.85)	0.003
Bisphosphonates	0.79 (0.64–0.97) ^d	0.022



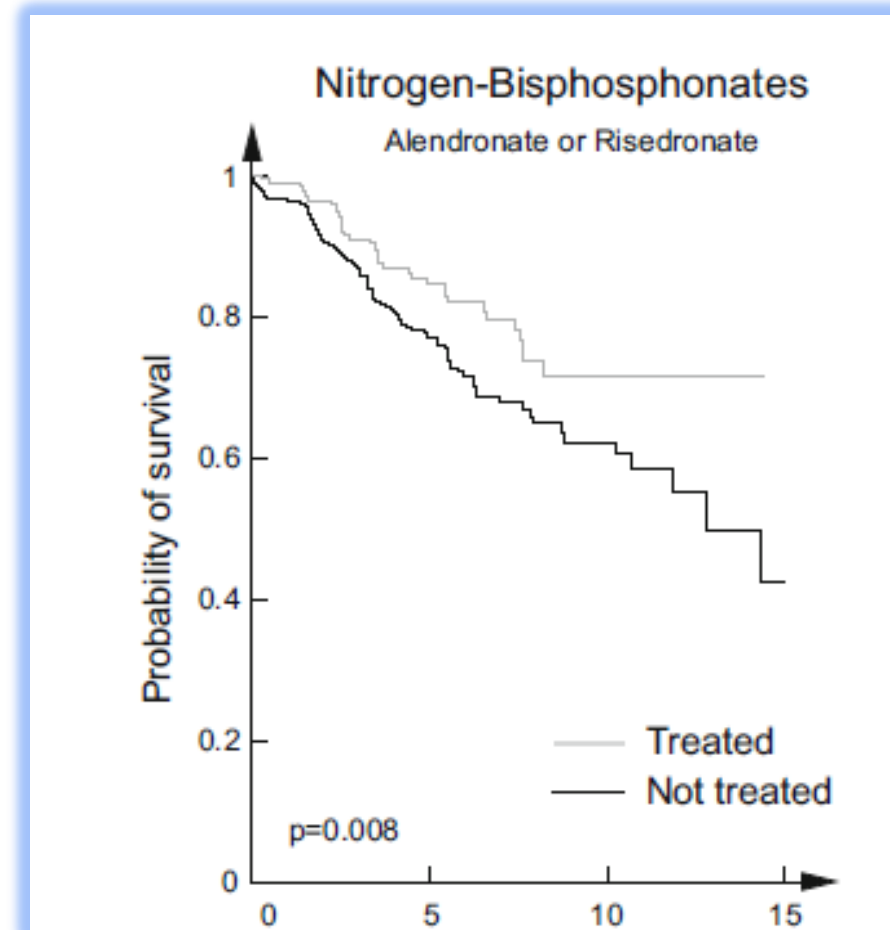
Mejorando la mortalidad post FF

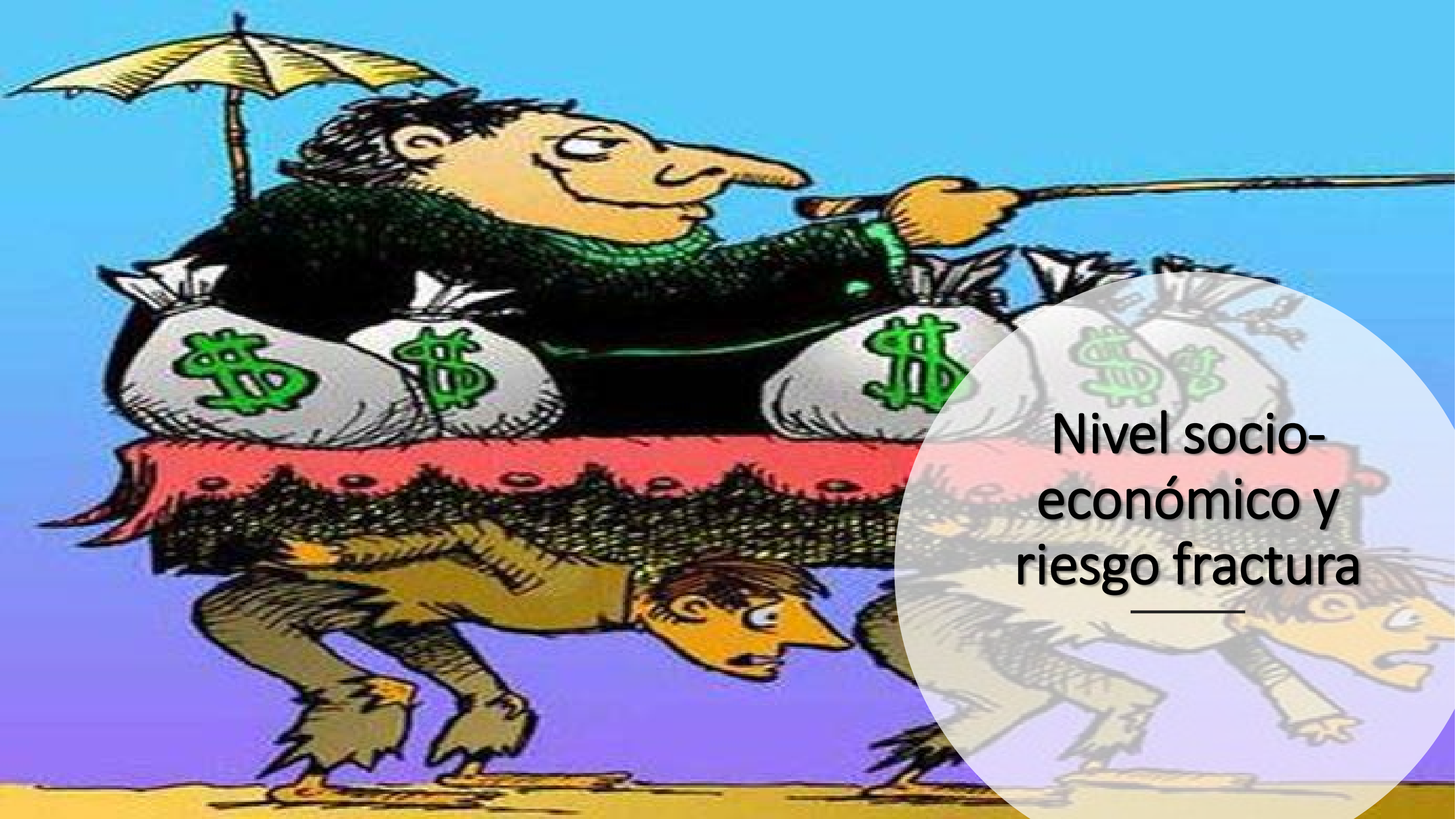
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Van Geel et al. PLoS One. 2018;13

Bliuc et al. Osteoporos Int 2019;30:817-28





Nivel socio-
económico y
riesgo fractura

ESE y riesgo fractura



- Estado socio-económico (ESE) se **relaciona** con múltiples patologías.
- Datos **controvertidos** en relación con el riesgo de **fracturas**.
- Índice deprivación **MEDEA** (basado en censo): paro, trabajo manual, trabajo temporal, nivel educativo y fracaso escolar. A mayor puntuación mayor deprivación.

Brennan et al. Osteoporos Int 2009;20:1487–97.

West et al. Public Health 2004;118:576–81.

Domínguez-Berjón et al. Gac Sanit 2008;22:179–87.

ESE y riesgo fractura



- Estudio ecológico retrospectivo.
- 2009-2012
- Exclusión áreas rurales
- Incidencia de fractura femoral

Table 1
Baseline characteristics.

	Women (%)	Current smoker (%)	High-risk alcohol intake (%)	Obesity (%)	Hypertension (%)	Diabetes (%)
Total	51.1	17.3	1.3	11.9	16.8	6.2
MEDEA ¹ quintile						
1	53.3	13.8	1.0	7.9	15.4	4.8
2	52.2	16.3	1.2	10.7	16.7	5.8
3	51.3	17.9	1.3	12.3	17.3	6.3
4	50.6	18.7	1.4	13.6	17.5	6.8
5	48.3	19.3	1.6	14.5	16.9	7.1

Hip fracture incidences according to the MEDEA scores.

	Hip fractures	Persons at risk	Crude incidence ¹	Sex-age-adjusted incidence ¹
Total	13,227	3,688 675	35.85 (35.16–36.54)	-
MEDEA ² quintiles				
1	2,761	630,365	43.8 (41.92–45.67)	38.57 (37.14–40.00)
2	2,691	739,589	36.38 (34.81–37.95)	34.52 (33.23–35.82)
3	2,893	826,621	34.99 (33.55–36.44)	34.85 (33.60–36.11)
4	2,679	759,570	35.27 (33.76–36.77)	36.89 (35.51–38.27)
5	2,203	732,530	30.07 (28.70–31.44)	34.33 (32.90–35.76)

ESE y riesgo fractura

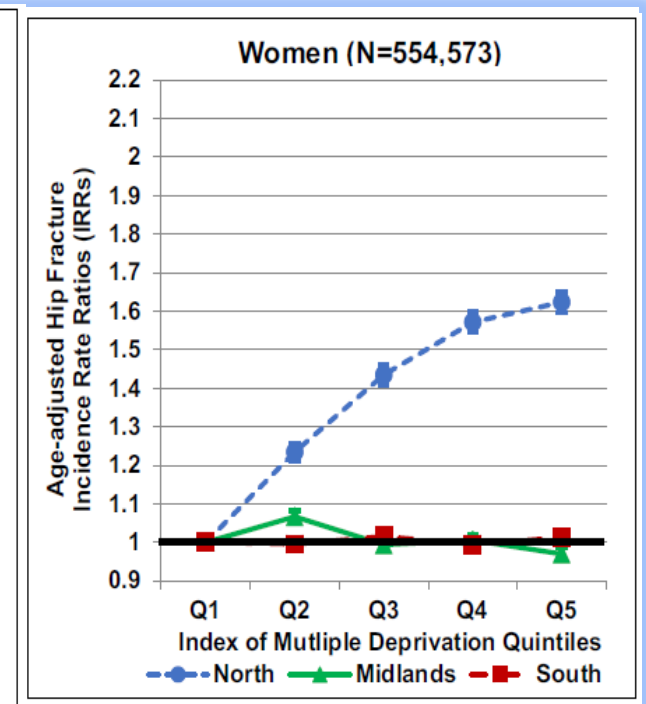
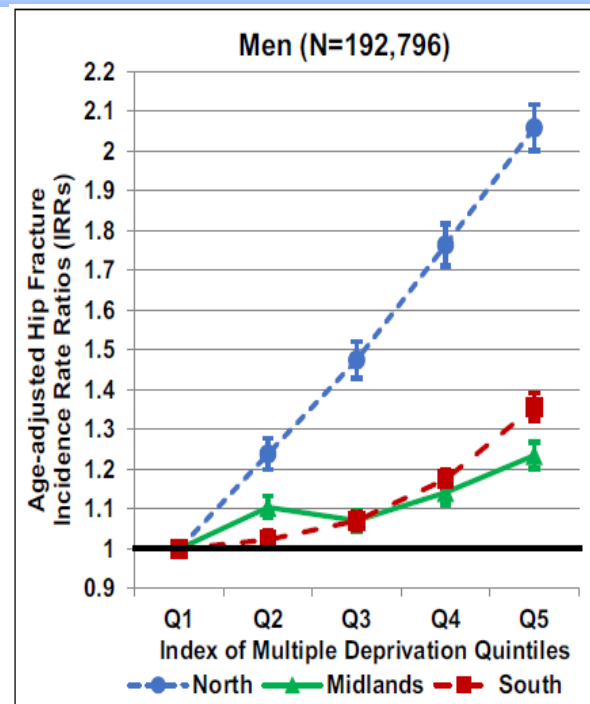
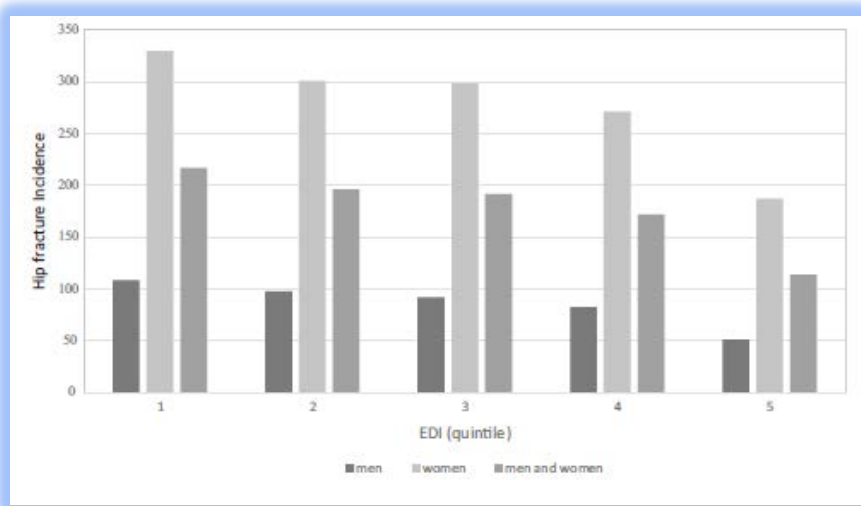


- Estudio ecológico retrospectivo.
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Hip fracture relative incident rates according MEDEA quintiles.

		Crude IRR	p-value	Sex-age-adjusted IRR	p-value	Age-sex-BMI-adjusted IRR	p-value
MEDEA ²	1	1		1		1	
quintiles	2	0.84 (0.79-0.90)	<0.0001	0.89 (0.85-0.95)	<0.0001	0.91 (0.87-0.97)	0.003
	3	0.78 (0.73-0.84)	<0.0001	0.90 (0.85-0.95)	<0.0001	0.93 (0.88-0.98)	0.019
	4	0.79 (0.73-0.86)	<0.0001	0.95 (0.90-1.00)	0.105	1.00 (0.94-1.06)	0.903
	5	0.71 (0.65-0.78)	<0.0001	0.90 (0.85-0.95)	<0.0001	0.96 (0.90-1.01)	0.189

¿Igual comportamiento?



Petit et al. *Osteoporos Int* 2017;28:2045-51
Bhimjiyani et al. *Osteoporos Int* 2018;115-24
Bhimjiyani et al. *Public Health* 2018;162:25-31

Conclusiones

- La FF es un problema de salud **prevalente** asociado a un aumento de la mortalidad.
- Tendencias seculares apuntan a **descenso incidencia FF**, sobre todo en mujeres. Variación geográfica y según nivel deprivación.
- La **brecha en el tratamiento** continua siendo inaceptable (>85%)
- Los FPO se asocian a un **descenso** en la **mortalidad**.



2ª JORNADA CATALANA D'ORTOGERIATRIA
2ª JORNADA CATALANA DE ORTOGERIATRIA
31 DE MAIG – 31 DE MAYO 2019

INCIDENCIA Y PREVALENCIA DE LA FRACTURA DE CADERA. ESTUDIOS POBLACIONALES ESPAÑOLES, DANESSES E INGLESSES.

Daniel Martínez Laguna

Grup de treball Osteoporosi CAMFIC – Grup recerca GREMPAL IDIAP Jordi Gol
CIBER Fragilidad y Envejecimiento Saludable. CAP Sant Martí de Provençals (BCN ICS)



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