

Actividad física / sedentarismo

Causas Reales de Muerte USA

Causas	N(%) en 1990*	N(%) en 2000**
Tabaco	400.000 (19)	435.000 (18,1)
Dieta y sedentarismo	300.000 (14)	365.000 (15,2)
Alcohol	100.000 (5)	85.000 (3,5)
Agentes infecciosos	90.000 (4)	75.000 (3,1)
Agentes tóxicos	60.000 (3)	55.000 (2,3)
Automóviles	25.000 (1)	43.000 (1,8)
Armas	35.000 (2)	29.000 (1,2)
Actividad sexual	30.000 (1)	20.000 (0,8)
Drogas	20.000 (<1)	17.000 (0,7)
Total	1.060.000 (50)	1.159.000 (48,2)

Fuentes: *McGinnis & Foege, JAMA 1993; 270: 2207-2212, **Mokdad et al. JAMA 2004; 291:1238 y corrección en JAMA 2005; 293: 293

Metabolismo basal (*resting metabolic rate*)

- ~1 Kcal/kg peso/hora
(sentado y quieto)
- 60 Kg:
 - 60 Kcal/hora
 - 1440 Kcal/d

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- Andar rápido (*brisk walking*):
~4 Kcal/kg peso/hora

Metabolismo basal (*resting metabolic rate*)

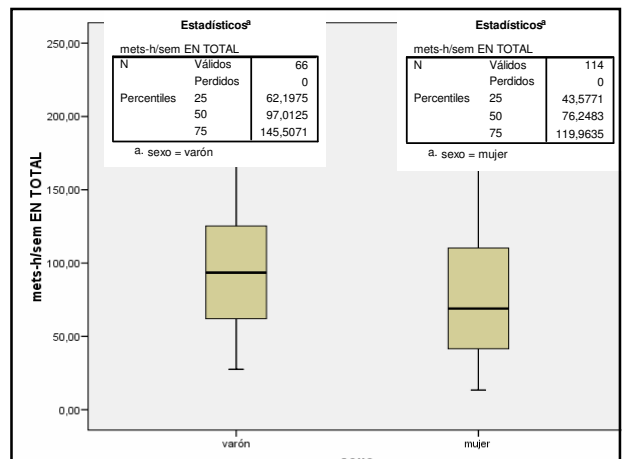
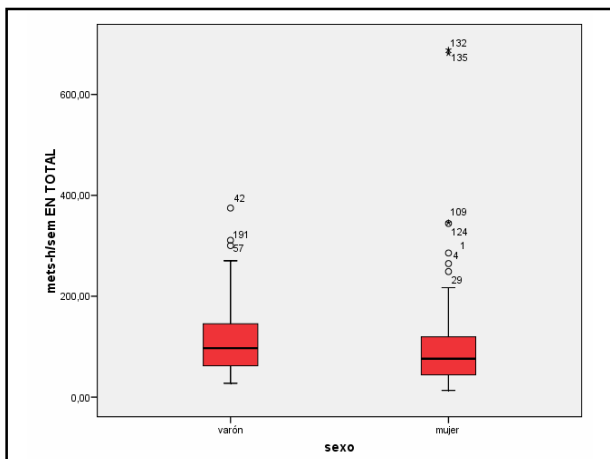
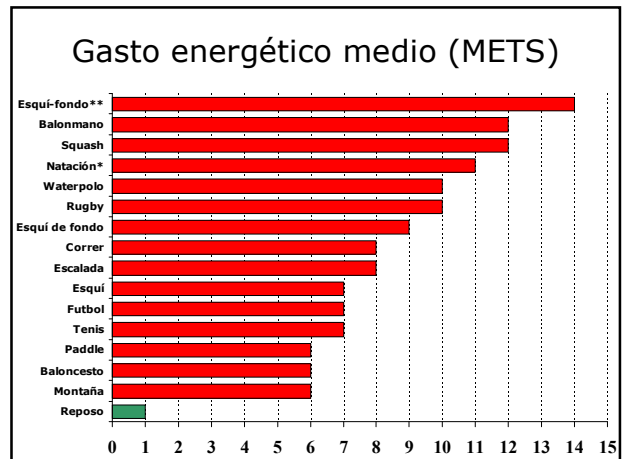
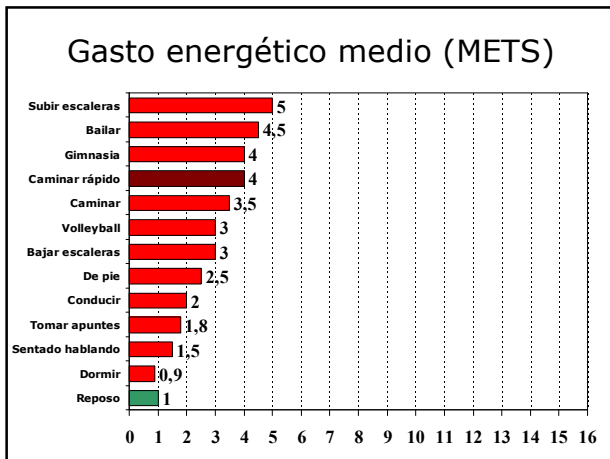
- ~1 Kcal/kg peso/hora
(sentado y quieto)
- 60 Kg:
 - 60 Kcal/hora
 - 1440 Kcal/d
- Andar rápido (*brisk walking*):
~4 Kcal/kg peso/hora
- Todo el día quieto + 2 horas *brisk walking*
 $(22 \times 1 \times 60) + (2 \times 4 \times 60) = 1320 + 480 = 1800$

MET

Equivalentes METabólicos (MET)

- MET: energía empleada por el organismo estando en reposo, sentado y quieto, por unidad de tiempo.
 - 1 MET \approx 3,5 ml O₂ /kg peso/minuto
 - 1 MET \approx 1 Kcal/kg/hora \approx 1 MET

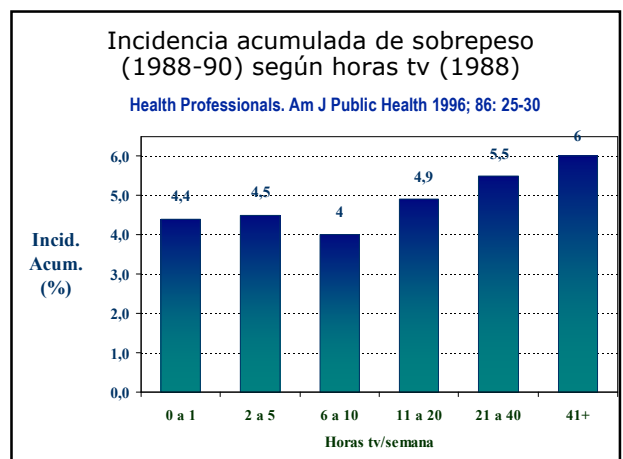
$$\text{Valor en METS} = \frac{\text{Gasto energético/kg peso/ hora en esa actividad}}{\text{Gasto energético/kg peso/ hora en reposo}}$$



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El sedentarismo como FR

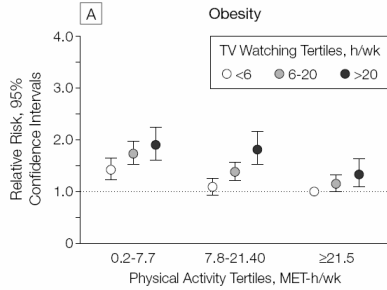
- Obesidad
- Diabetes
- Hipertensión
- Cardiopatía isquémica
- Ictus
- Cáncer
- Osteoporosis
- Depresión y trastorno ansiedad
- Mortalidad total



Television Watching and Other Sedentary Behaviors in Relation to Risk of Obesity and Type 2 Diabetes Mellitus in Women *JAMA 2003;289:1785-1791*

Relative Risks of Developing Obesity Among Nonobese Women According to Joint Classification of Physical Activity Levels (MET-h/wk) and Time Spent Watching TV.

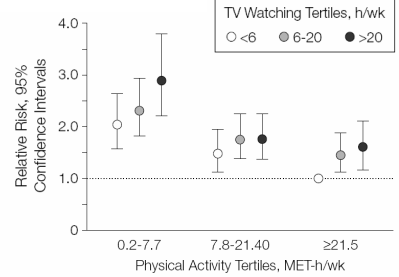
50 277 women who had a BMI <30 and were free from diagnosed cardiovascular disease, diabetes, or cancer at baseline.



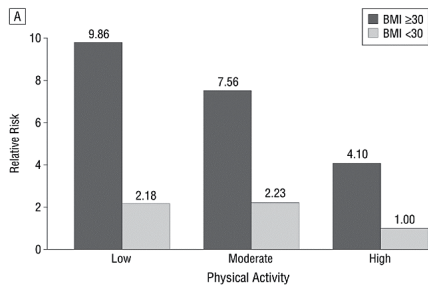
Television Watching and Other Sedentary Behaviors in Relation to Risk of Obesity and Type 2 Diabetes Mellitus in Women *JAMA 2003;289:1785-1791*

Relative Risks of Developing Type 2 Diabetes Among Nondiabetic Women According to Joint Classification of Physical Activity Levels (MET-h/wk) and Time Spent Watching TV.

68 497 women who at baseline were free from diagnosed diabetes mellitus, cardiovascular disease, or cancer.



RR diabetes tipo 2 según nivel de actividad física e IMC



4369 sujetos seguidos durante 9.4 años

Cohorte Finlandesa. Hu G, et al. Arch Intern Med 2004;164:892-896

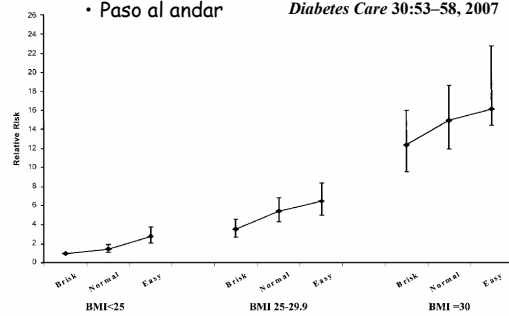
Epidemiología analítica

• **Diabetes tipo 2**

- Factores de riesgo modificables:

• Paso al andar

Diabetes Care 30:53-58, 2007



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Sedentary Behaviors and the Risk of Incident Hypertension *Am J Hypertens 2007;20:1156-62*

The SUN Cohort

Juan José Beunza, Miguel Ángel Martínez-González, Shah Ebrahim, Maira Bes-Rastrollo, Jorge Núñez, José Alfredo Martínez, and Álvaro Alonso

Statistical Analysis

We conducted a multivariable Cox regression analysis that included 6742 SUN cohort participants (2576 men and 4166 women), to evaluate the association between sedentary behavior, categorized in quartiles, and incident hypertension. Hazard ratios (HRs) of HTN and their 95% confidence intervals (95% CIs) were estimated by comparing each category of sedentary behavior to the lowest category.

Table 2. Hazard ratios (95% confidence intervals) of self-reported hypertension according to quartiles of sedentary behaviors, in SUN Study, 1999 to 2006

	Quartiles of total sedentary behavior				P for trend
	1 (lowest)	2	3	4 (highest)	
Total sedentary behavior (h/day) (range)	<14.2	14.2 to 17.2	17.2 to 21.0	>21.0	
Incident cases	65	75	82	69	
N	1686	1686	1685	1685	
Age- and sex-adjusted HR (95% CI)	1	1.30 (0.93 to 1.82)	1.49 (1.07 to 2.08)	1.54 (1.08 to 2.19)	.01
Multivariate HR (95% CI)*	1	1.15 (0.79 to 1.67)	1.28 (0.89 to 1.85)	1.48 (1.01 to 2.18)	.03

FIG. 1. Multivariate hazard ratio (HR) (95% confidence interval) of hypertension according to categories of total sedentary behavior (low versus high) and physical activity (low versus high), using median as a cutoff point. (reference category: high physical activity, low sedentary behavior), from the SUN Study, 1999 to 2006.

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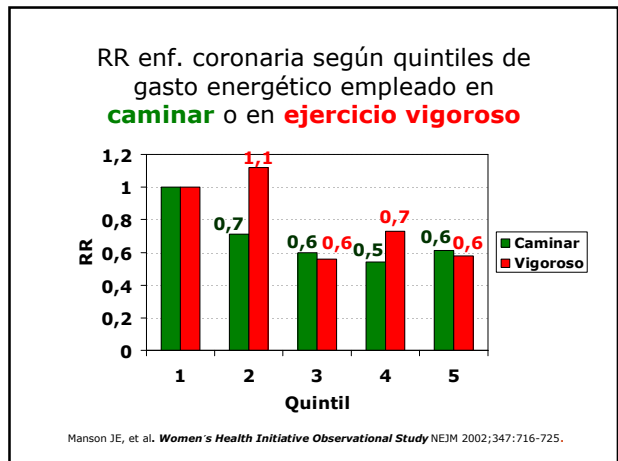
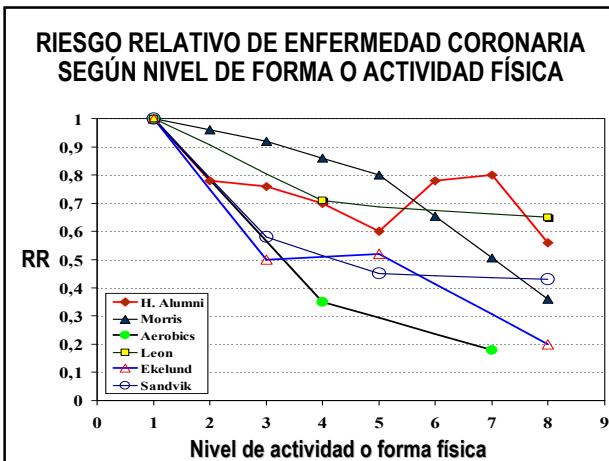
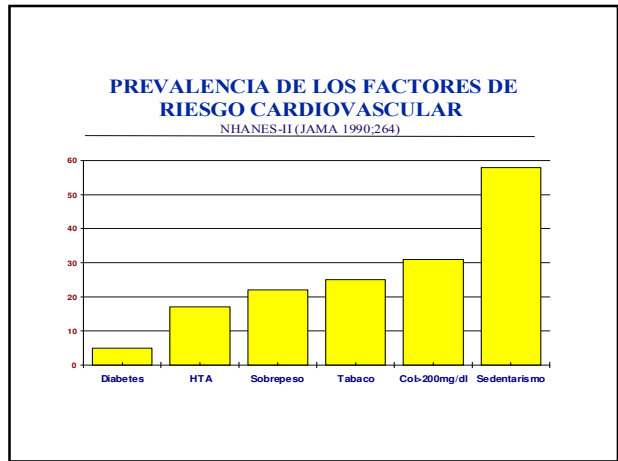
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INTERHEART STUDY. 52 países. 15152 casos. 14820 controles

Risk factor	Sex	Control (%)	Case (%)	Odds ratio (95% CI)	PAR (95% CI)
Current smoking	F	9.3	20.1	2.86 (2.36-3.48)	15.8% (12.9-19.3)
	M	33.0	53.1	3.05 (2.78-3.33)	44.0% (40.9-47.2)
Diabetes	F	7.9	25.5	4.26 (3.51-5.18)	19.1% (16.8-21.7)
	M	7.4	16.2	2.67 (2.36-3.02)	10.1% (8.9-11.4)
Hypertension	F	28.3	53.0	2.95 (2.57-3.39)	35.8% (32.1-39.6)
	M	19.7	34.6	2.32 (2.12-2.53)	19.5% (17.7-21.5)
Abdominal obesity	F	33.3	45.6	2.26 (1.90-2.68)	35.9% (28.9-43.6)
	M	33.3	46.5	2.24 (2.03-2.47)	32.1% (28.0-36.5)
Psychosocial index	F	-	-	3.49 (2.41-5.04)	40.9% (28.6-52.6)
	M	-	-	2.58 (2.11-3.14)	25.3% (18.2-34.0)
Fruityveg	F	50.3	39.4	0.58 (0.48-0.71)	17.8% (12.9-24.1)
	M	39.6	34.7	0.74 (0.66-0.83)	10.7% (6.9-15.2)
Exercise	F	16.5	9.3	0.48 (0.39-0.59)	37.3% (26.1-50.0)
	M	20.3	15.8	0.77 (0.69-0.85)	22.9% (16.9-30.2)
Alcohol	F	11.2	6.3	0.41 (0.32-0.53)	46.3% (24.3-59.0)
	M	29.1	29.6	0.88 (0.81-0.96)	10.5% (6.1-17.5)
ApoB/ApoA1 ratio	F	14.1	27.0	4.42 (3.43-5.70)	52.1% (44.0-60.2)
	M	21.9	35.5	3.76 (3.13-4.38)	53.8% (48.3-59.2)

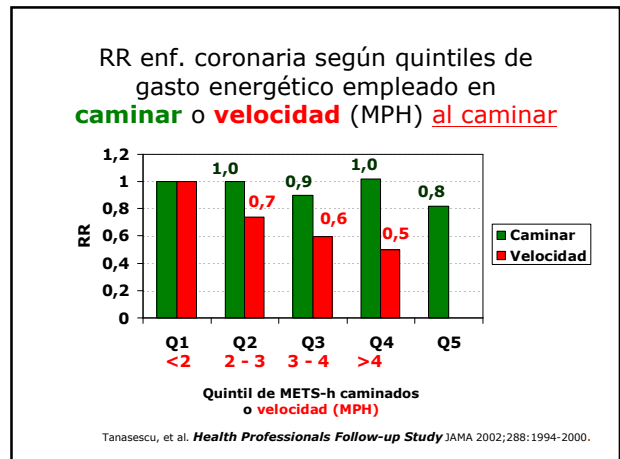
judged to be physically active if they were regularly involved in moderate (walking, cycling, or gardening) or strenuous exercise (jogging, football, and vigorous swimming) for 4 h or more a week.

Fuente: Lancet 2004;364:937-52



Estadísticos ^a			Estadísticos ^a		
mets-h/sem ANDAR			mets-h/sem ANDAR		
N	Válidos	65	N	Válidos	111
	Perdidos	1		Perdidos	3
Percentiles	25	13,3125	Percentiles	25	13,1250
	50	26,7400		50	23,6250
	75	40,1100		75	31,5000

a. sexo = varón a. sexo = mujer

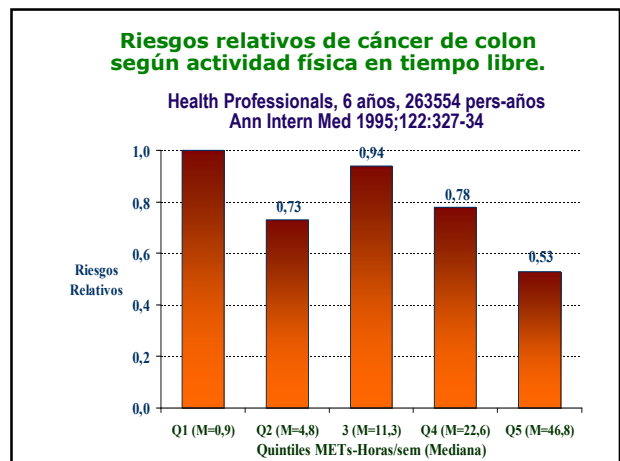
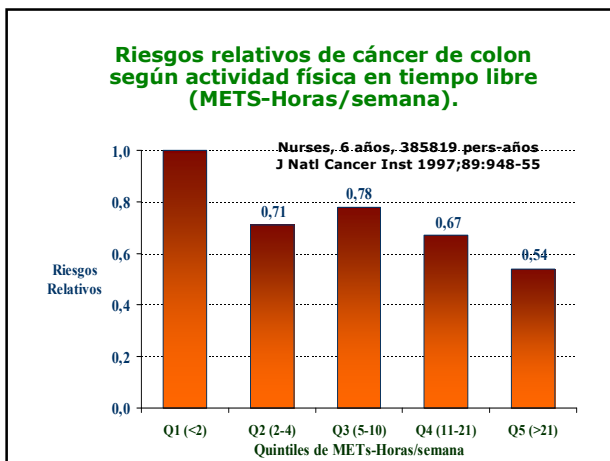


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Sedentarismo y cáncer

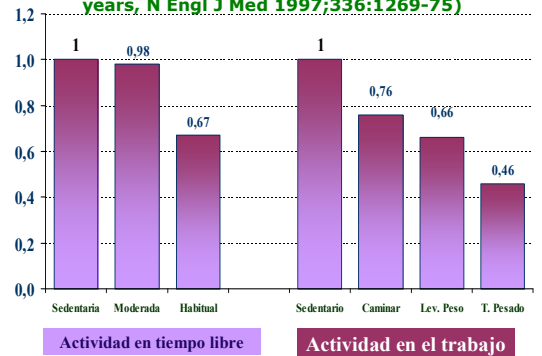
- Colon****
- Mama*
- Pulmón (±)
- Otros (?): ovario, endometrio, próstata, testículo



Actividad física previene cancer colon
 Samad, et al. *Colorectal Dis* 2005;7:204-13.

- Metanálisis: 19 cohortes
- CONCLUSIONS:
 - There is considerable evidence that physical activity is associated with reduced risk of colon cancer in both males and females.
 - Men
 - RR = 0.79 (0.72-0.87) for occupational
 - RR = 0.78 (0.68-0.91) for recreational activities,
 - Women
 - only recreational activities
 - RR = 0.71 (0.57-0.88)

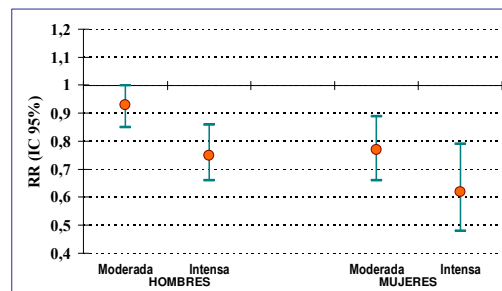
RR ajustados de cáncer de mama
 (25,624 women, 20-54 years median follow-up = 13.7 years, *N Engl J Med* 1997;336:1269-75)



Actividad física previene cancer mama
 Monninkhof, et al. *Epidemiology* 2007;18:137-57

- Metanálisis: 19 cohortes y 29 casos-contróles
- CONCLUSIONS:
 - There is evidence for an inverse association between physical activity and breast cancer risk.
 - The evidence is stronger for **post**menopausal breast cancer than for premenopausal breast cancer.
 - For pre- and postmenopausal breast cancer combined, physical activity was associated with a modest (15-20%) decreased risk.
 - RRR = 6% (3% a 8%) for each additional h/wk

Actividad física en tiempo libre y cáncer de pulmón: metanálisis, 2005

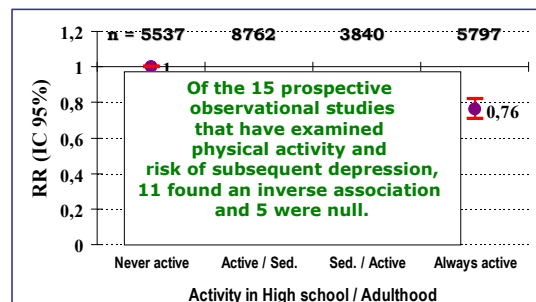


Tardon A, Lee WJ, Delgado-Rodriguez M, et al. *Cancer Causes Control* 2005;16:389-97

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OR de síntomas depresivos (CES-D 16+) en relación con **ejercicio físico** en el tiempo libre a los 8 años de seguimiento. *Black Women's Health Study* (seguim. a 4 años: 1995-1999)



Ann Behav Med 2006;32:68-76

Physical Activity, Sedentary Index, and Mental Disorders in the SUN Cohort Study

ALMUDENA SANCHEZ-VILLEGAS^{1,2}, IGNACIO ARA³, FRANCISCO GUILLÉN-GRIMA^{2,4}, MAIRA BES-RASTROLLO^{2,5}, JOSE JAVIER VARO-CENARRUZABEITIA², and MIGUEL A. MARTÍNEZ-GONZÁLEZ²

¹Department of Clinical Sciences, University of Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, SPAIN; ²Department of Preventive Medicine and Public Health, University of Navarra-Clinica Universitaria, Pamplona, SPAIN; ³Department of Psychiatry and Nursing, University of Zaragoza, Huesca, SPAIN; ⁴Department of Health Sciences, Public University of Navarra, Navarra, SPAIN; and ⁵Department of Nutrition, Harvard School of Public Health, Boston, MA

Med Sci Sports Exerc 2008 May;40:827-834

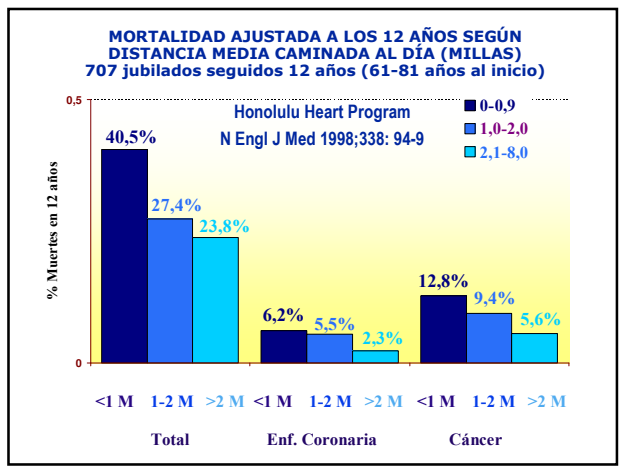
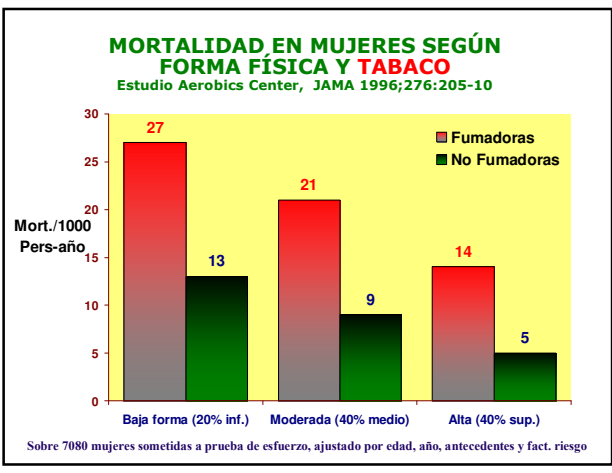
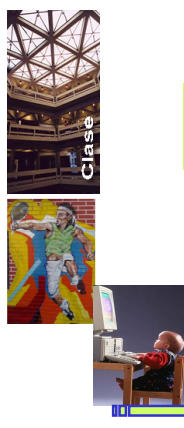
The odds ratios (OR) of a mental disorder for successive levels of leisure-time physical activity were 1 (reference), **1.00 (0.81, 1.23)**, **0.99 (0.81, 1.21)**, **0.72 (0.58, 0.89)**, **0.81 (0.65, 1.00)** (P for trend: < 0.01).

The OR for subjects who spent more than 42 h/wk watching television and/or using the computer was **OR = 1.31 (1.01, 1.68)** as compared with those spending less than 10.5 h.wk.



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Resumen

- **Buena** evidencia de
 - riesgos del sedentarismo
 - beneficios de actividad física
 - No es necesario que sea violenta/excesiva
 - Lo ideal es integrarla en la vida diaria
- **Mala** evidencia de
 - Efectividad del consejo médico

