

At least five a week

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The report

Department of Health (2004) At least five a week. Evidence of the impact of physical activity and its relationship with health. London, United Kingdom.

Available at www.dh.gov.uk/publications



Chapters include:

- **Physical activity and public health**
- **Physical activity recommendations**
- **Physical activity in childhood and adolescence**
- **Physical activity for adult health**
- **Physical activity for older adults**
- **Risks of physical activity**



Physical activity may reduce the risk of disease and enhance physical and mental health

- **CVD**
- **Overweight and obesity**
- **Diabetes**
- **Musculoskeletal health**
- **Psychological well-being and mental illness**
- **Cancer**



Cardiovascular disease

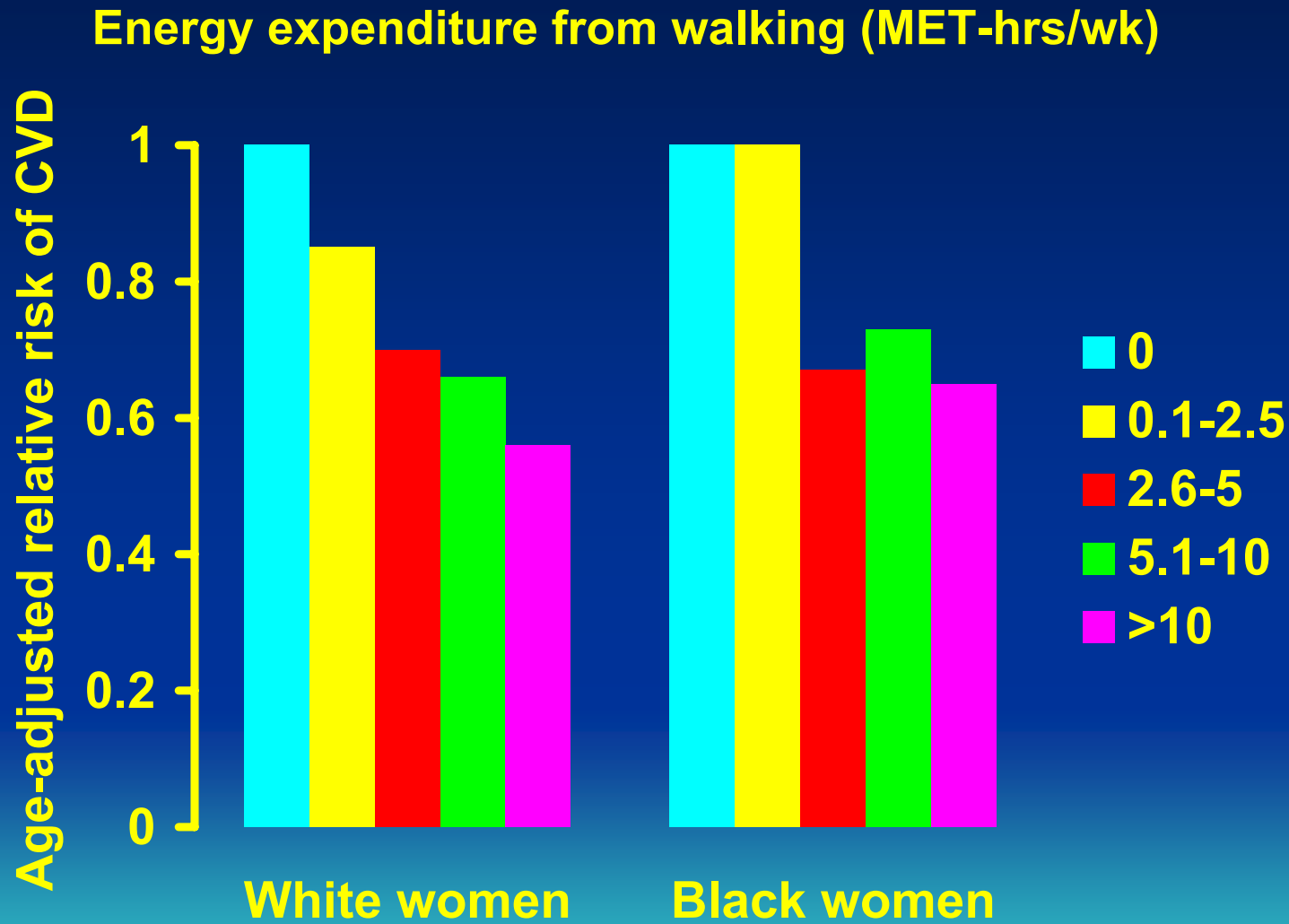


Walking, vigorous exercise & CVD risk in women

- **Women's Health Initiative Observational Study**
- **73,743 postmenopausal women 50-79 y**
- **Free from disease at baseline (1994-1998)**
- **Follow-up duration = 3.2 y**
- **345 newly diagnosed cases of CHD**
- **1551 'cardiovascular events'**
- **Energy expenditure estimated in MET-hr/wk**
- **Vigorous ex. = activities with MET scores of ≥ 6**

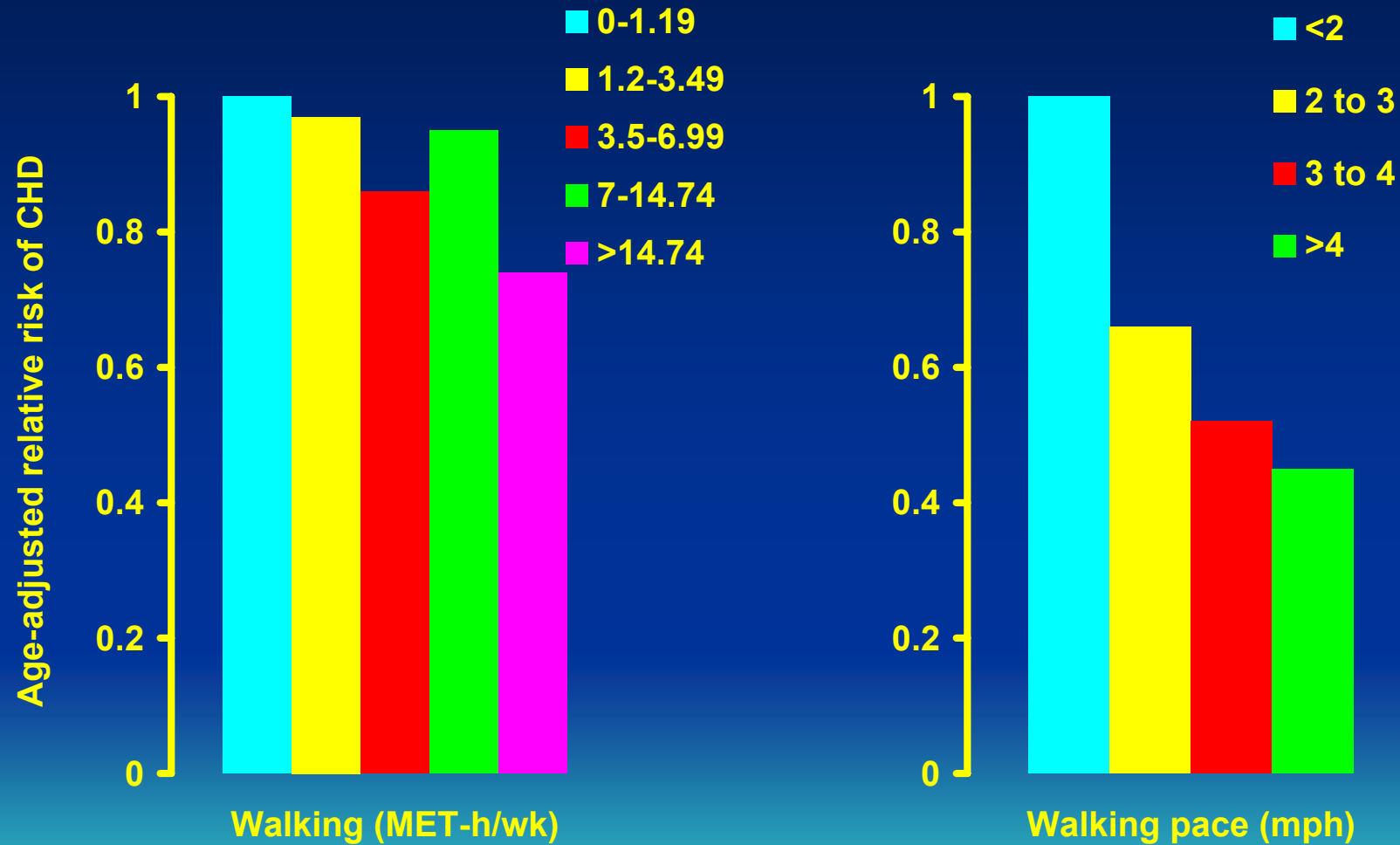
Manson et al (2002) NEJM 347: 716-25

Walking, vigorous exercise & CVD risk in women



Manson et al (2002) NEJM 347: 716-25

Exercise type & intensity and CHD



Tanasescu et al (2002) JAMA 288: 1994-2000

Prevention of CHD through diet & lifestyle

- 84,129 women in the Nurses Health Study
- Free from disease at baseline (1980)
- 1128 coronary events during 14-y follow-up
- Identified five 'low risk factors':
 - Non-smokers
 - BMI <25 kg/m²
 - Alcohol consumption \geq 5 g/day
 - Moderate-to-vigorous exercise \geq 30 min/day
 - Diet: high in fibre, marine n-3 fatty acids, folate & polyunsaturated fat; low in trans fat & glycaemic load

Stampfer et al (2000) NEJM 343: 16-22

Prevention of CHD through diet & lifestyle

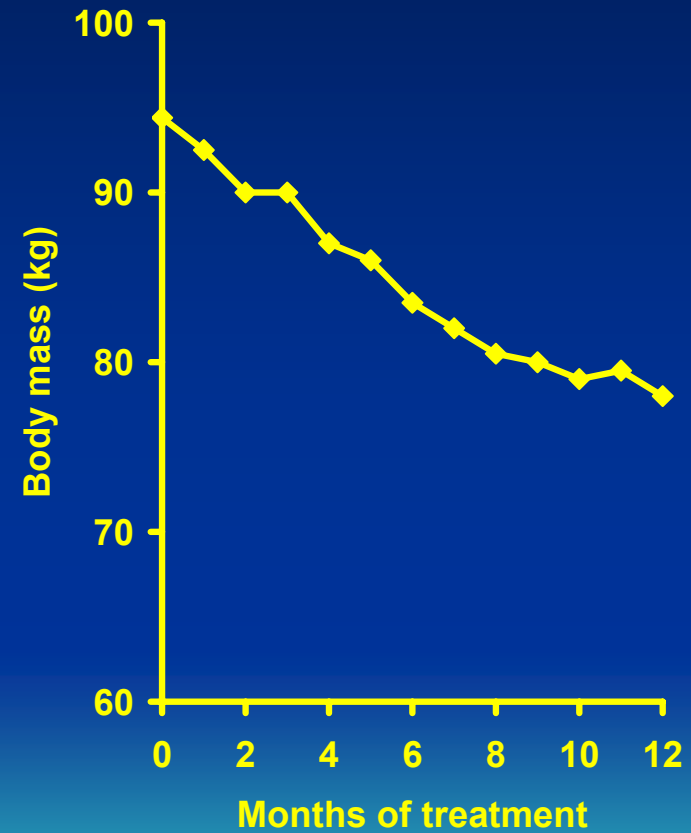
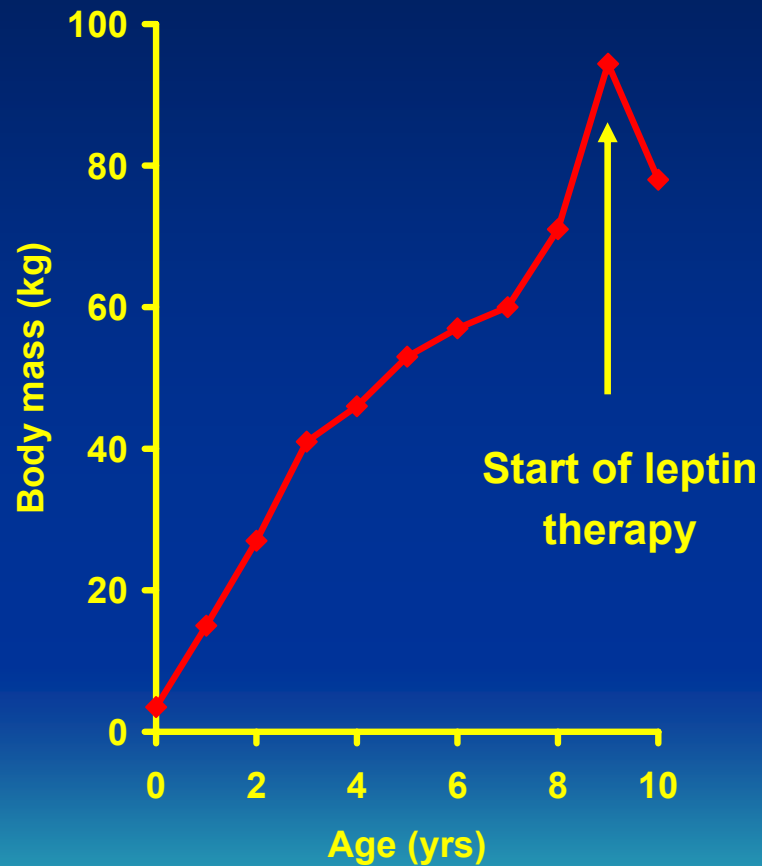
Low risk factors	% in group	No. of CHD events	Relative risk	Population attributable risk
Diet, NS & ex.	12.7	62	0.43	54
Diet, NS, ex. & BMI	7.2	24	0.34	64
Diet, NS, ex., BMI & alcohol	3.1	5	0.17	82

Stampfer et al (2000) NEJM 343: 16-22

Overweight and obesity

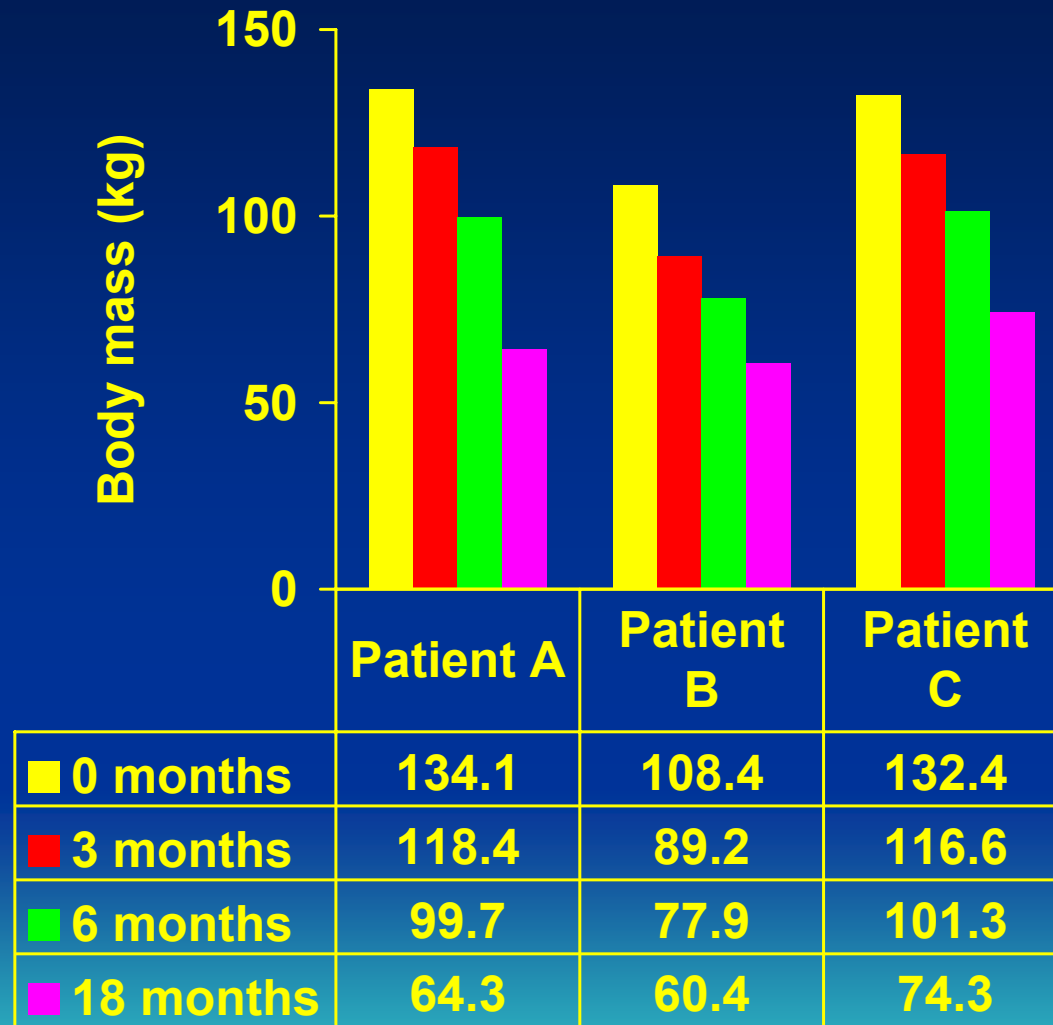


Reduction in body mass following leptin therapy in a leptin deficient child



Farooqi et al (1999) NEJM 341: 879-884

Leptin therapy induces weight loss in leptin deficient adults

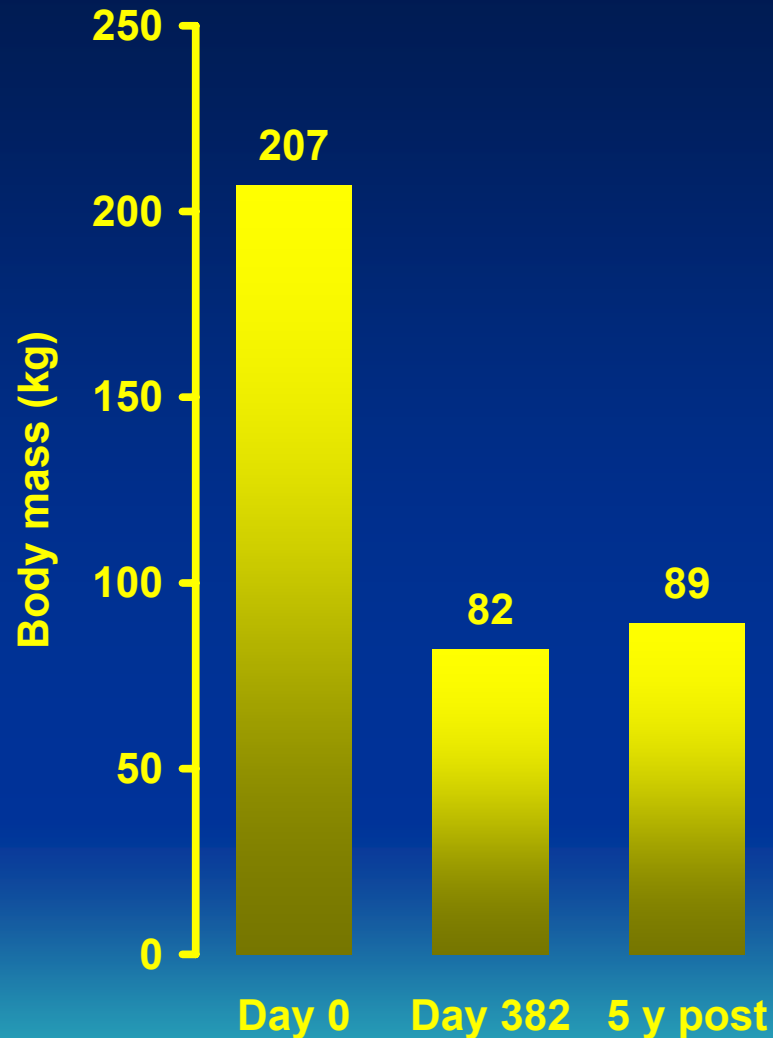


Fasting glucose
(mmol.L⁻¹)

Patient	Pre	Post
A	5.1	4.3
B	4.9	4.7
C	7.3	4.8

Licino et al (2004) PNAS 101: 4531-4536

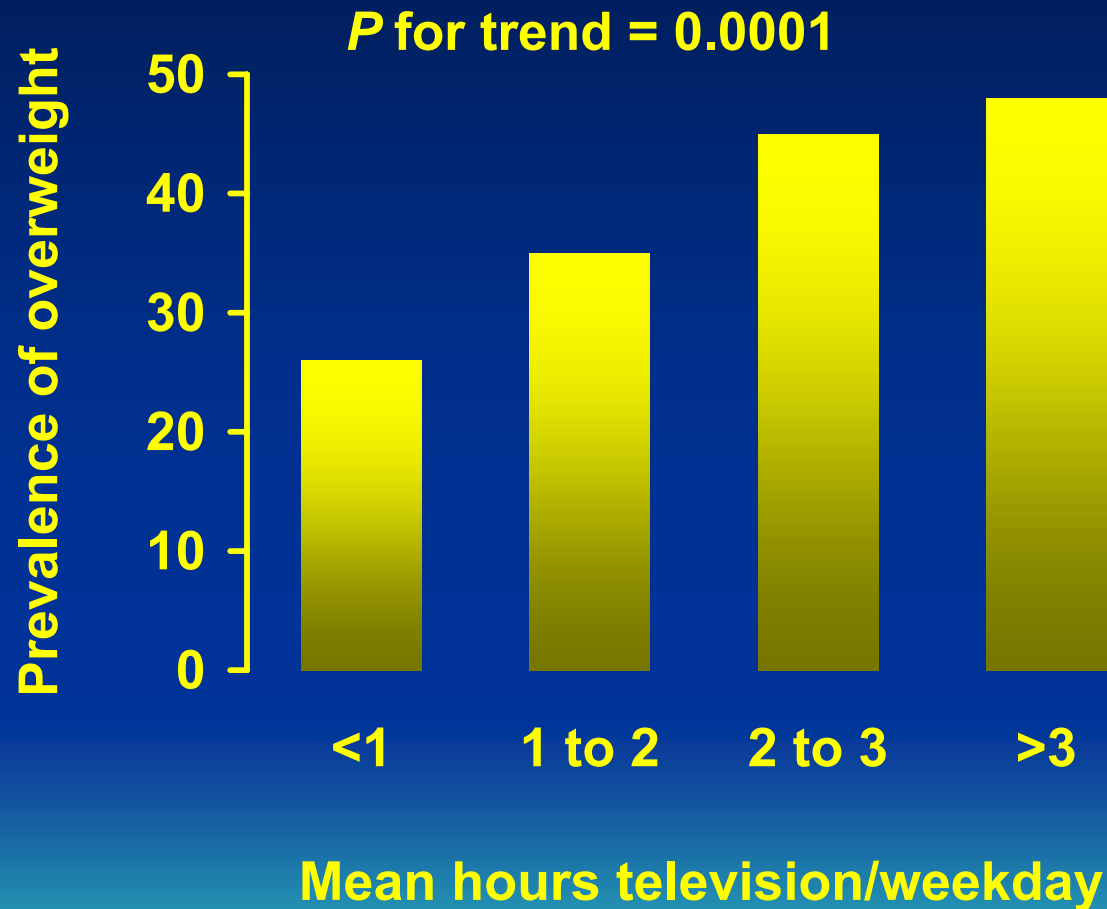
Fasting and weight loss



Body mass in one subject following a 382 day fast (under medical supervision)

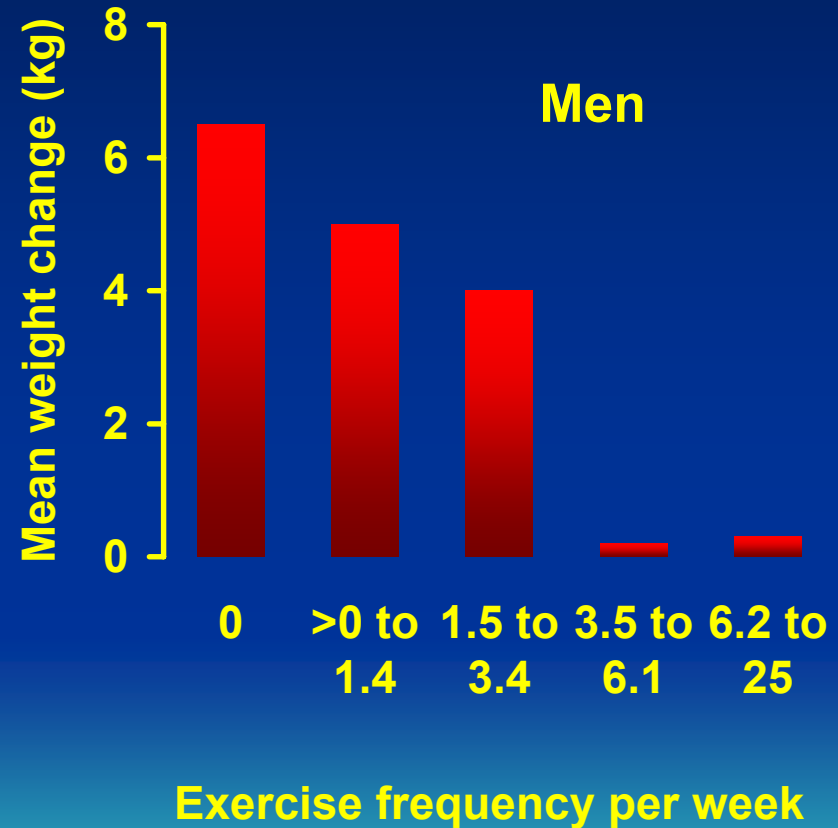
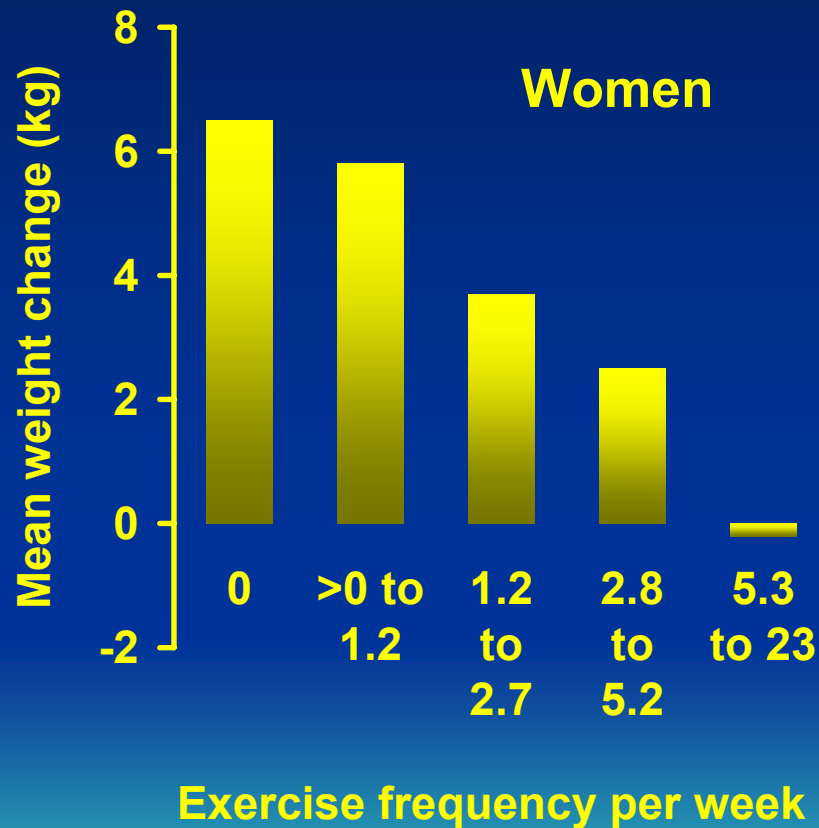
“... evacuation was infrequent, there being 37-48 days between stools latterly.”

Prevalence of overweight (BMI ≥ 25 kg/m²) at age 26 years according to mean hours of TV viewed per weekday between ages 5 and 15 yrs



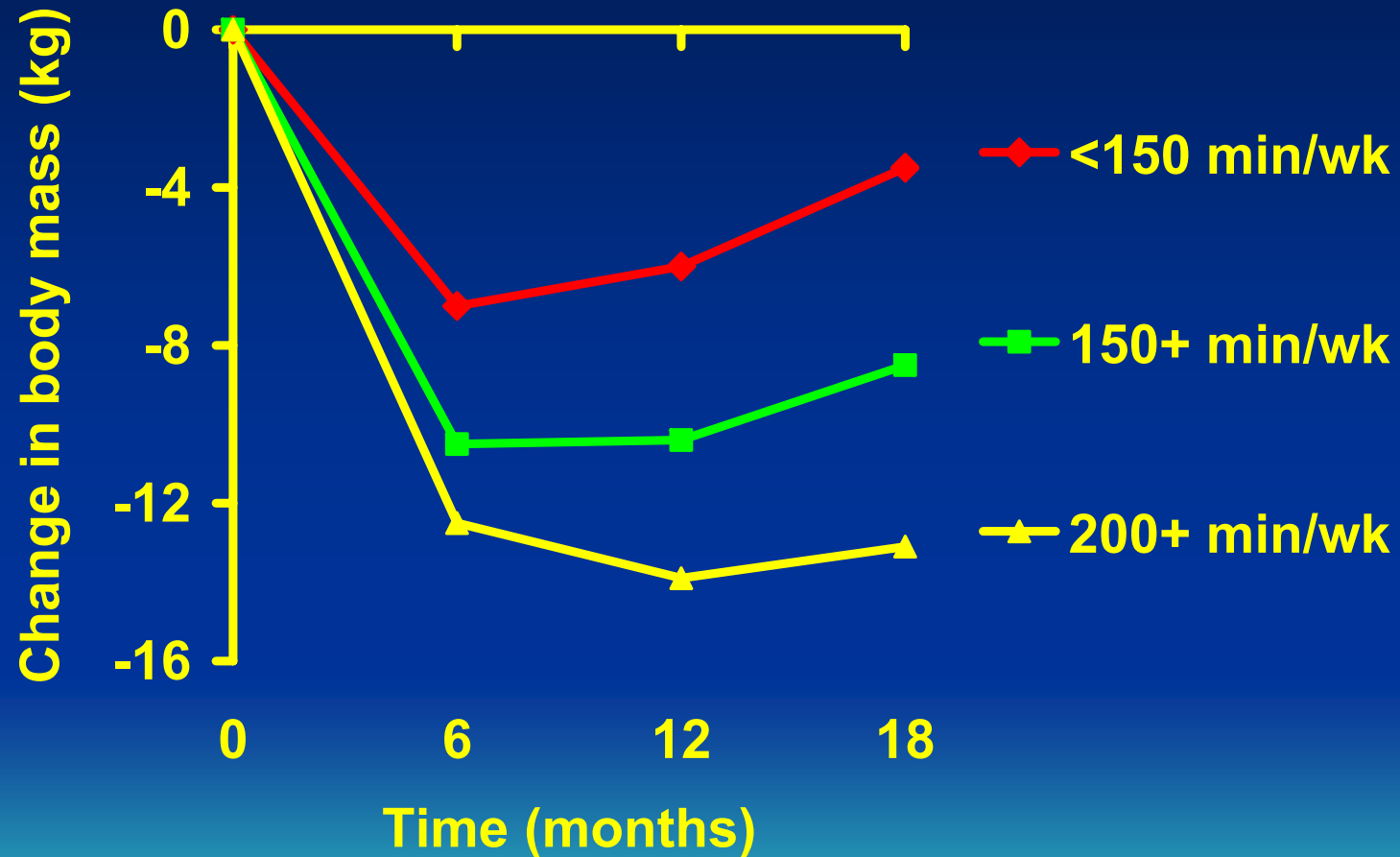
Hancox et al (2004) Lancet 364: 257-262

Weight gain after age 45 y in obese (BMI ≥ 30 kg/m²) men and women aged 53 to 57 y grouped by weekly frequency of physical activity over the previous 10 y



Littman et al (2005) IJO 29: 524-533

Effects of exercise (in combination with dietary and behavioural advice) on weight loss in overweight women: a randomized trial



Jakicic et al (1999) JAMA 282: 1554-1560

Type 2 diabetes



Diabetes Prevention Program

Randomized intervention trial

- Multi-centre trial conducted in the US
- 3,234 men and women with impaired fasting glucose and impaired glucose tolerance
- Random allocation to placebo, metformin or lifestyle modification
- Lifestyle modification goals were at least a 7% weight loss and at least 150 min/week of physical activity

Knowler et al (2002) NEJM 346: 393-403

The incidence of type 2 diabetes (cases per 100 person-yr) in the Diabetes Prevention Program.

	Age (years)		
	25-44	45-59	>59
Placebo	11.6	10.8	10.8
Metformin	6.7	7.6	9.6
Lifestyle	6.2	4.7	3.1

Knowler et al (2002) NEJM 346: 393-403

Cancer



Examples of contrasting incidence rates of cancers in different countries

Cancer	High	Low	Relative risk (High/Low)
Skin	Australia	Japan	155
Prostate	US	China	70
Colon	US	India	19
Stomach	Japan	Kuwait	22
Cervix	Brazil	Israel	28
Liver	China	Canada	49

Adapted from King (2000) Cancer Biology. Harlow, England: Prentice Hall

Summary of epidemiological evidence to September 2000 on the associations between physical activity and cancer

Cancer site	Consistency of evidence	Strength of risk association	
		Range of relative risk	Average risk reduction (%)
Colon	39 of 46 studies	0.3-1.0	40-50
Breast	24 of 36 studies	0.3-1.6	30-40
Prostate	15 of 26 studies	0.5-2.2	10-30
Lung	6 of 8 studies	0.4-1.3	30-40
Endometrial	8 of 11 studies	0.1-1.0	30-40
Testicular	3 of 8 studies	0.5-3.3	20
Ovarian	2 of 5 studies	0.3-2.1	0

Adapted from Friedenreich (2001) *Cancer Epidemiology, Biomarkers and Prevention* 10: 287-301

Mental health

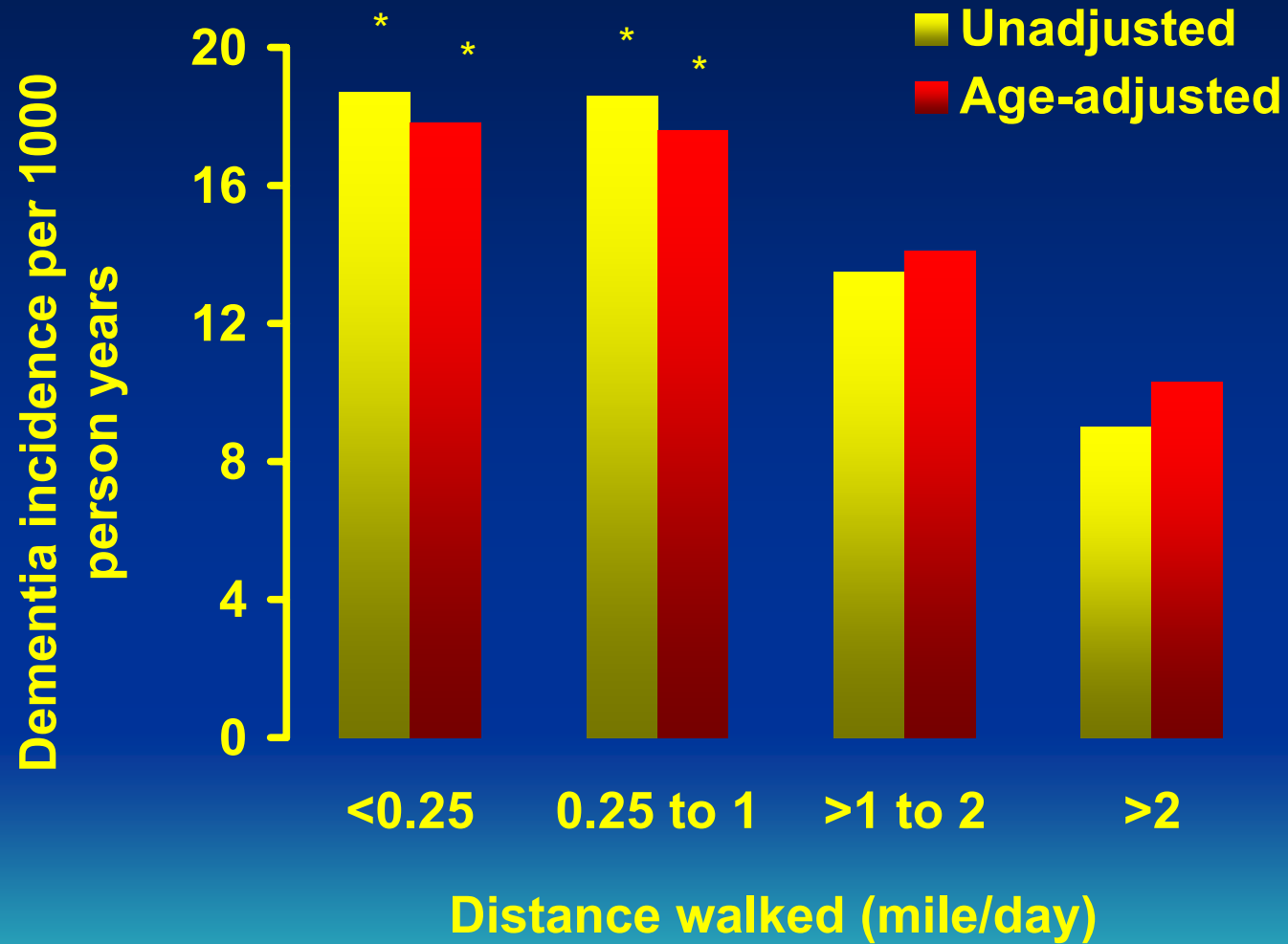


Walking and dementia in physically capable elderly men

- A prospective cohort study
- The subjects were 2257 men aged 71 to 93 years enrolled in the Honolulu-Asia Aging Study
- Distance walked per day assessed from 1991-1993
- Dementia diagnosed based on neurological assessment at 2 repeat examinations (1994-1996 and 1997 to 1999).
- Average follow-up duration was nearly 7 years

Abbott et al (2004) JAMA 292: 1447-53

Walking and dementia in physically capable elderly men



Abbott et al (2004) JAMA 292: 1447-53

Questions

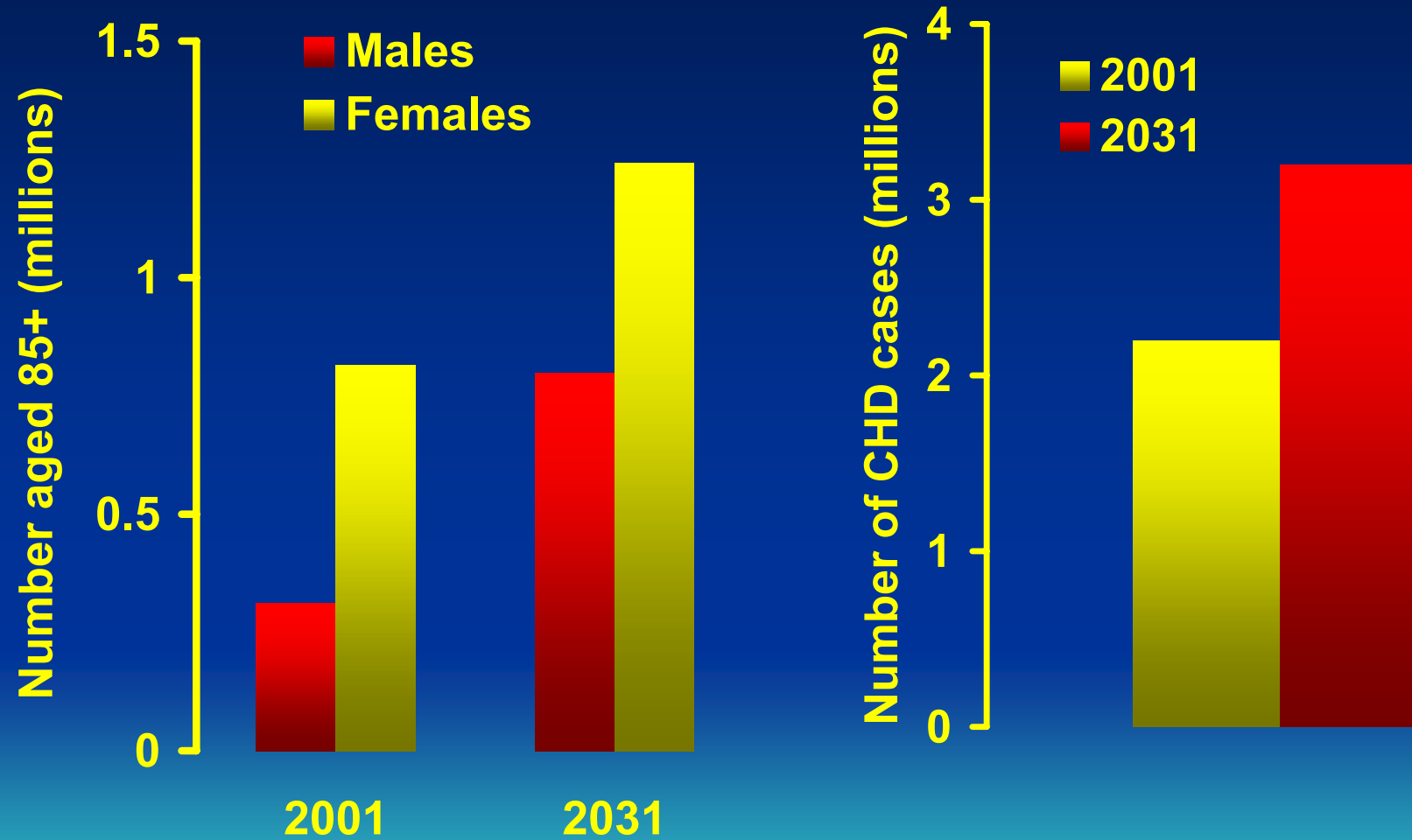
- **In 1911 there were 100 of these people in England and Wales**
- **Now there are 9,000 of these people**
- **What do these people have in common?**
- **If predictions are accurate how many of these people will there be in 2031?**



Older adults



The ageing population of the UK and CHD

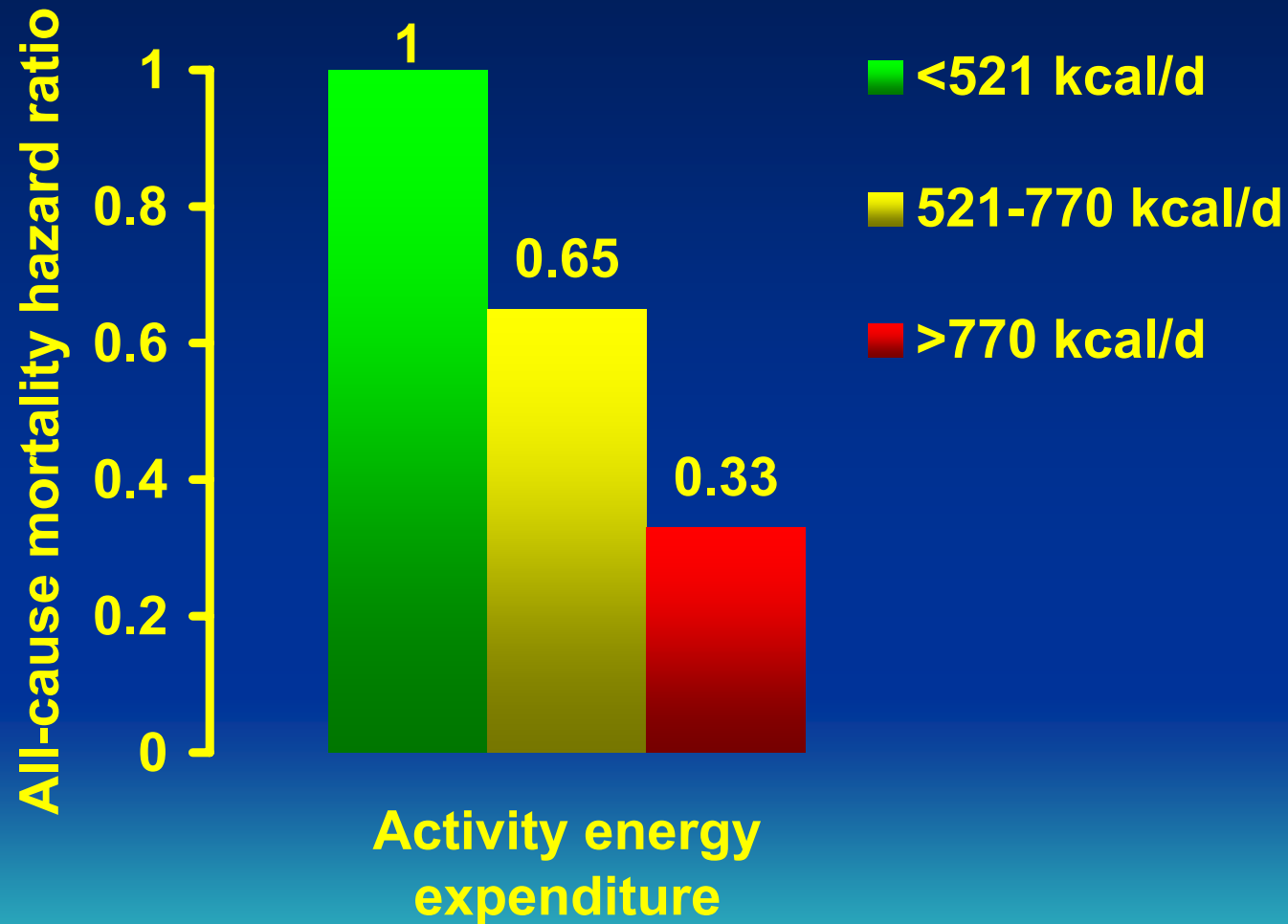


Majeed & Aylin (2005) BMJ 331: 1362

Daily activity energy expenditure and mortality among older adults

- The subjects were men and women aged 70-82 years
- Free living energy expenditure was assessed over a two week period using doubly labelled water
- Average follow-up was 6.15 years (1998-2006)
- Findings were adjusted for age, sex, race, study site, weight, height, %body fat, sleep duration, self-rated health, education, smoking status & history, CVD, lung disease, diabetes, hip or knee osteoarthritis, osteoporosis, cancer, & depression

All-cause mortality risk in older adults classified by daily energy expenditure

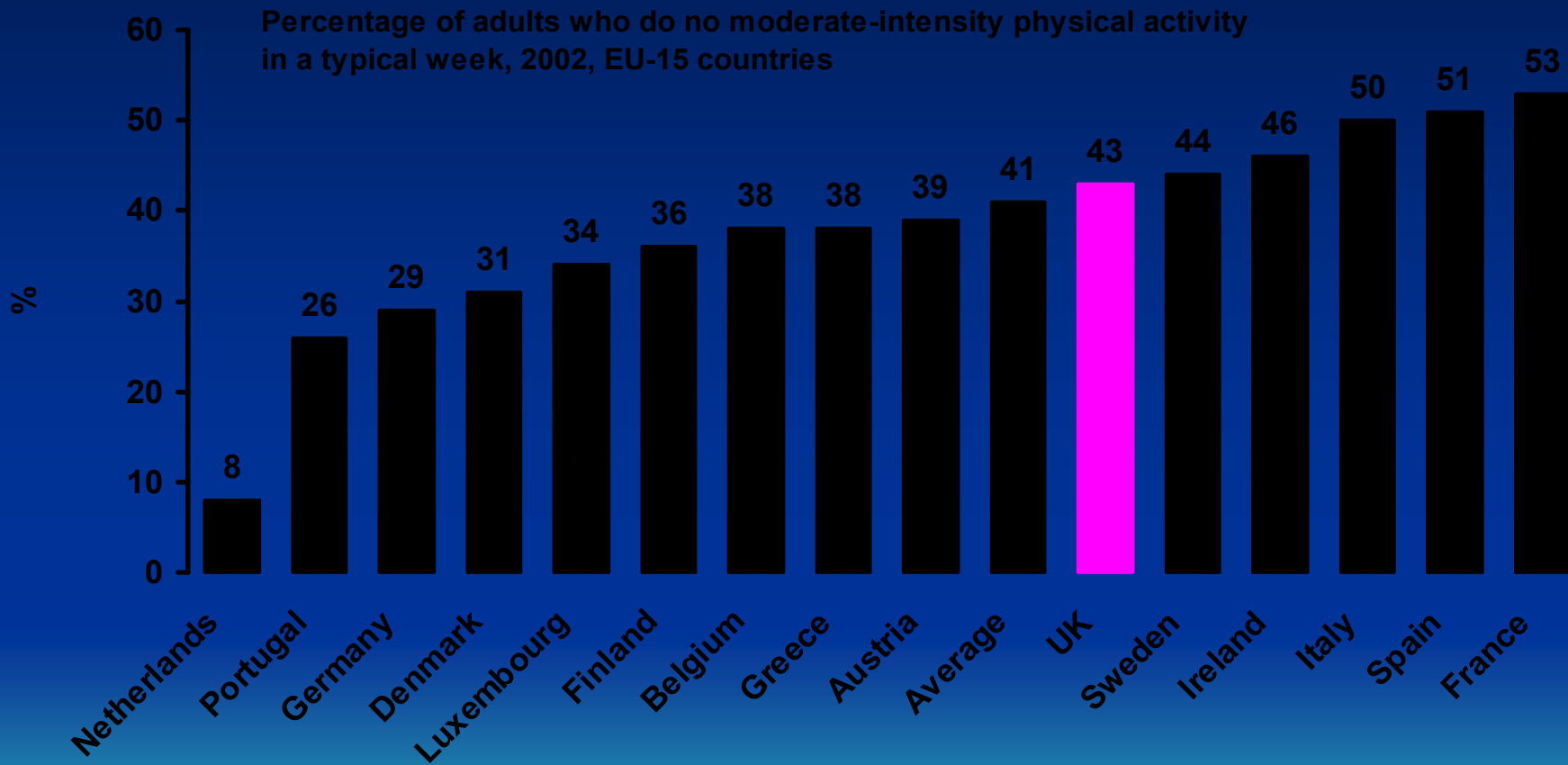


Manini et al (2006) JAMA 296: 171-179

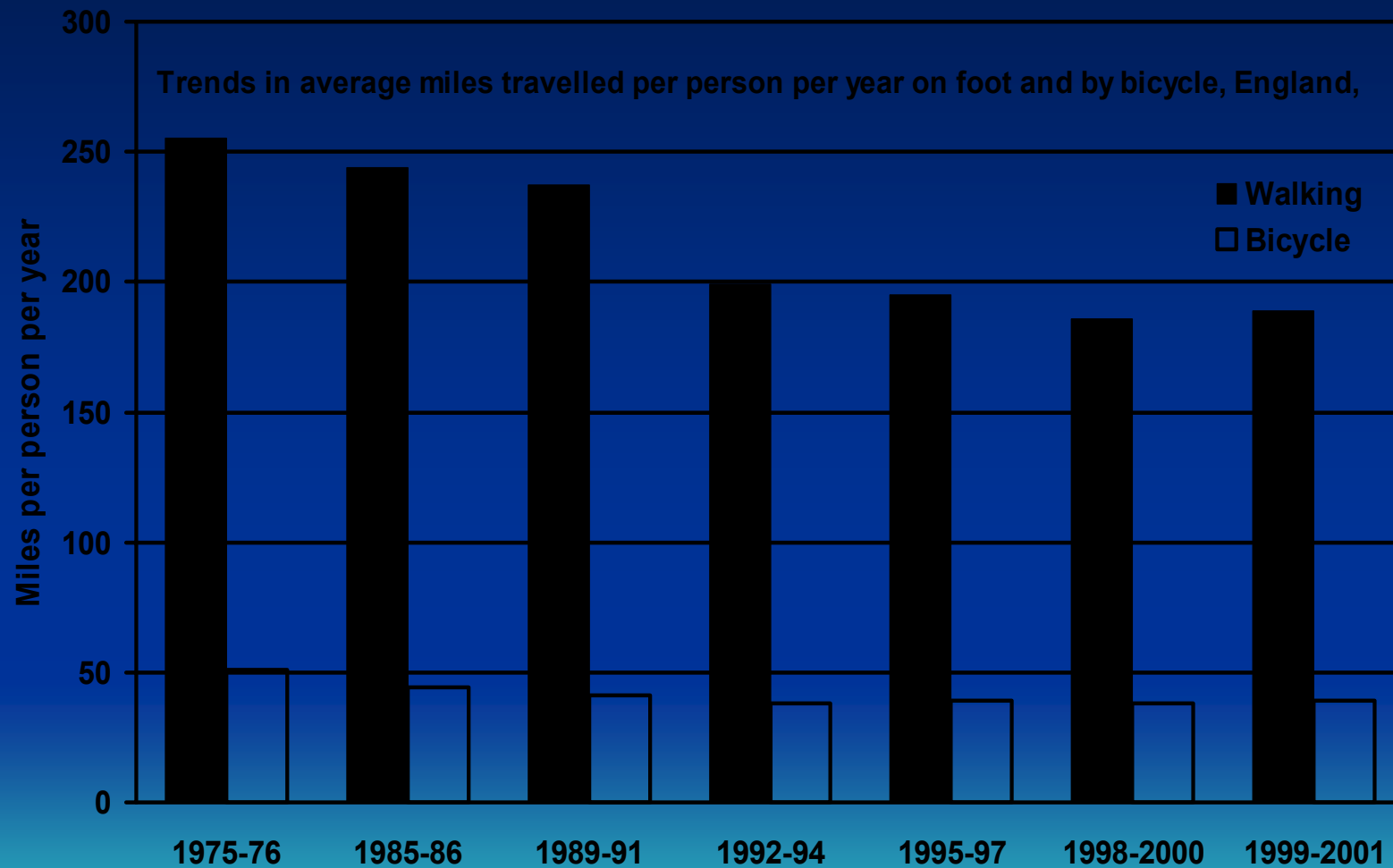
Physical activity levels



European Commission (2003) Physical Activity. Special Eurobarometer 183 6/Wave 58.2 – European Opinion Research Group EEIG.



Department for Transport (2001) National Travel Survey; 1999-2001 Update. London: Department of Transport.



Physical fitness



Study of men in California

Physical fitness

3,679 men with cardiovascular disease

2,534 men without cardiovascular disease

Average age = 59 years

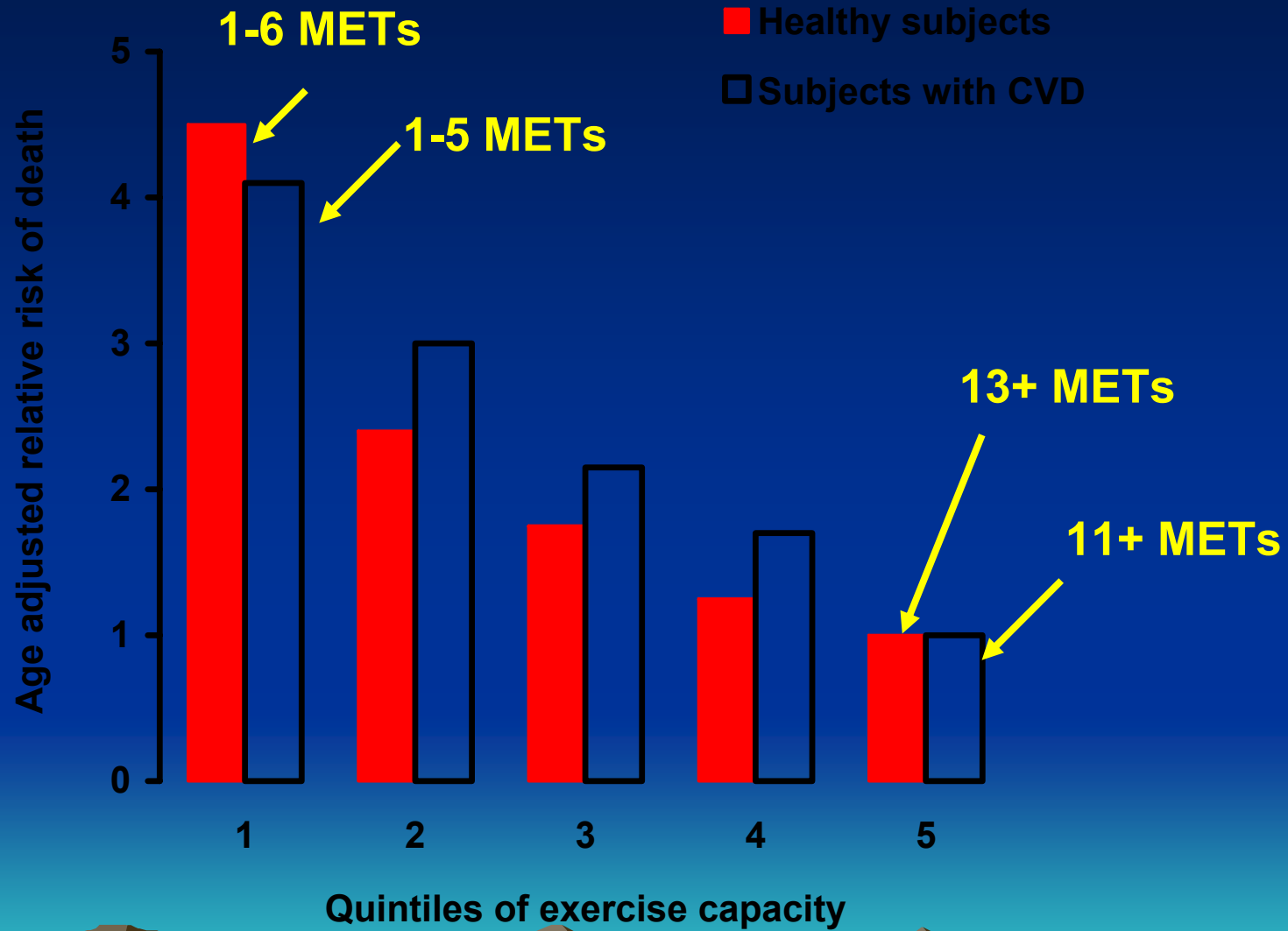
Average duration of follow-up = 6.2 years

1,256 deaths during follow-up

Physical fitness calculated in METs

Myers et al. (2002) NEJM 346: 793-801

Study of men in California



Myers et al. (2002) NEJM 346: 793-801

Risks of physical activity



Risks of physical activity

- The risks are low
- Risk increases with volume and intensity of exercise
- Contact sports increase risk
- Increased risk for those with pre-existing injury
- Activity levels should be increased gradually
- The health benefits outweigh the risks



Physical activity recommendations



Physical activity recommendations

- 60 minutes per day, every day, for children
- 30 minutes per day, five days per week, for adults
- Activity can be accumulated in 10 minute bouts
- For adults 45 to 60 minutes per day may be necessary to prevent obesity
- Activities that improve strength, coordination and balance are particularly beneficial for older adults



References

Department of Health (2004) At least five a week. Evidence on the impact of physical activity and its relationship to health.

Department of Health, London, UK. A PDF copy of this document can be downloaded from the Department of Health website: www.dh.gov.uk

Hardman, A.E. and Stensel, D.J. (2003) *Physical Activity and Health: The Evidence Explained*. Routledge Taylor and Francis Group, London.

