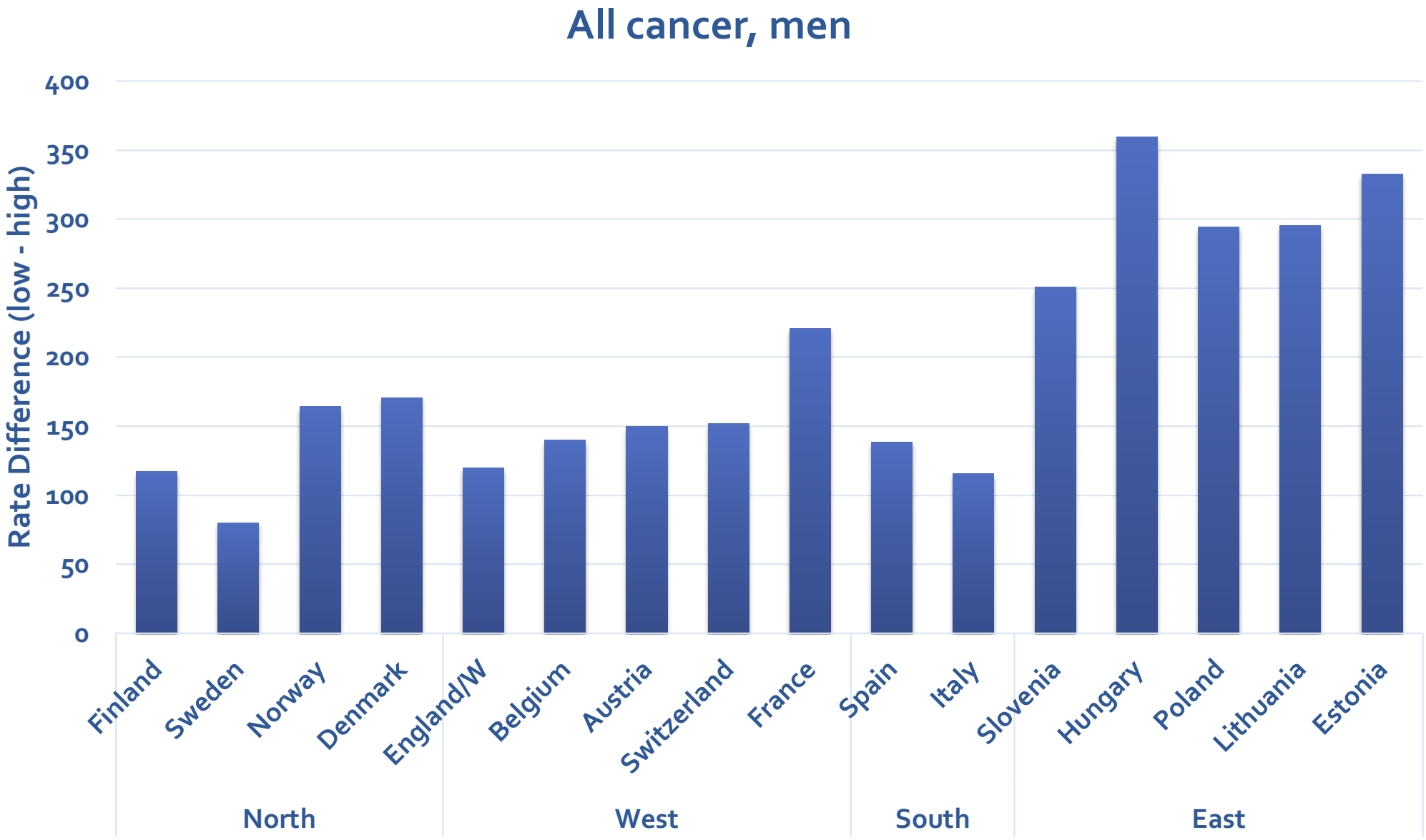
Paolo Vineis - Imperial College London and Italian Institute of Genomic Medicine

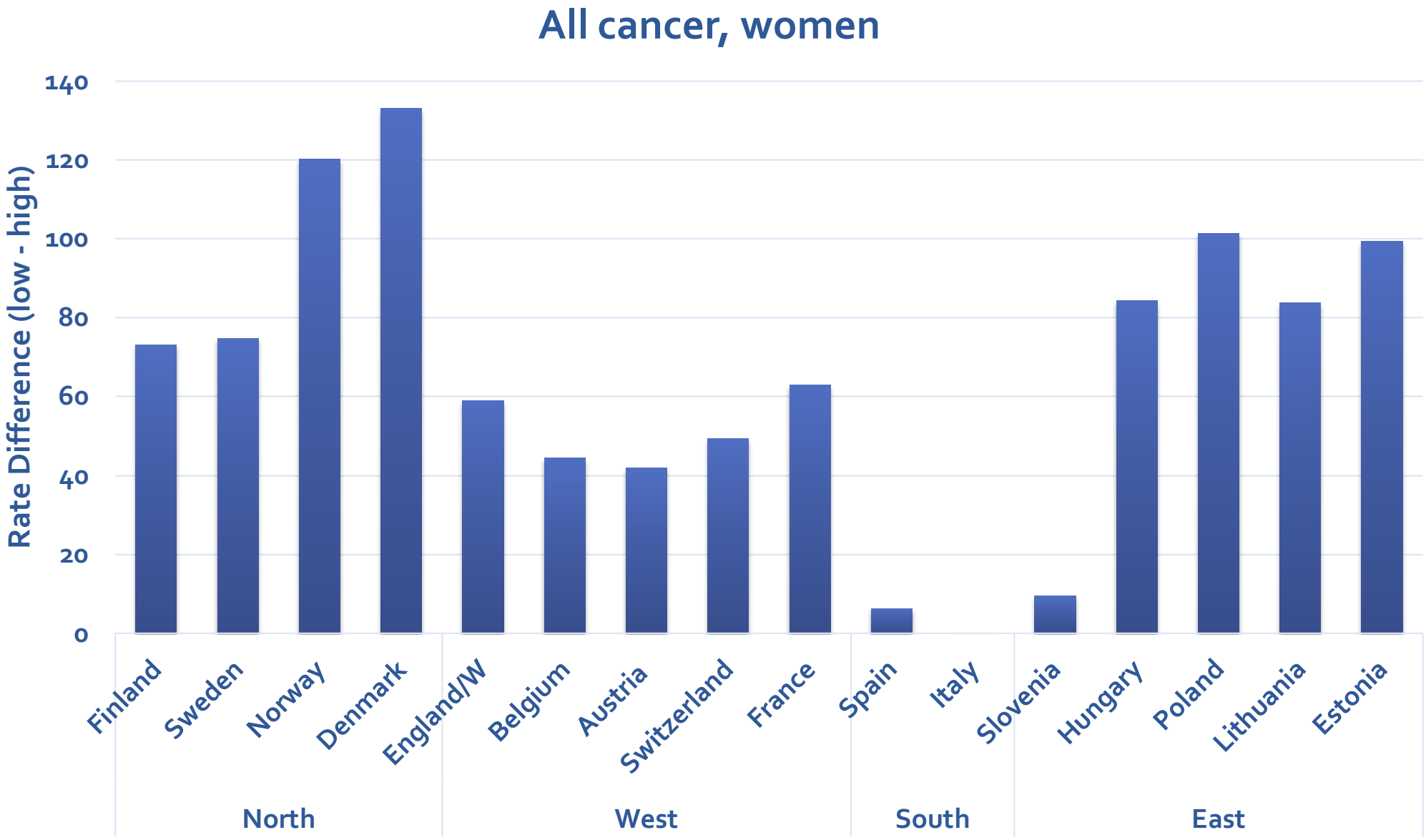
Disuguaglianze in Medicina e Oncologia

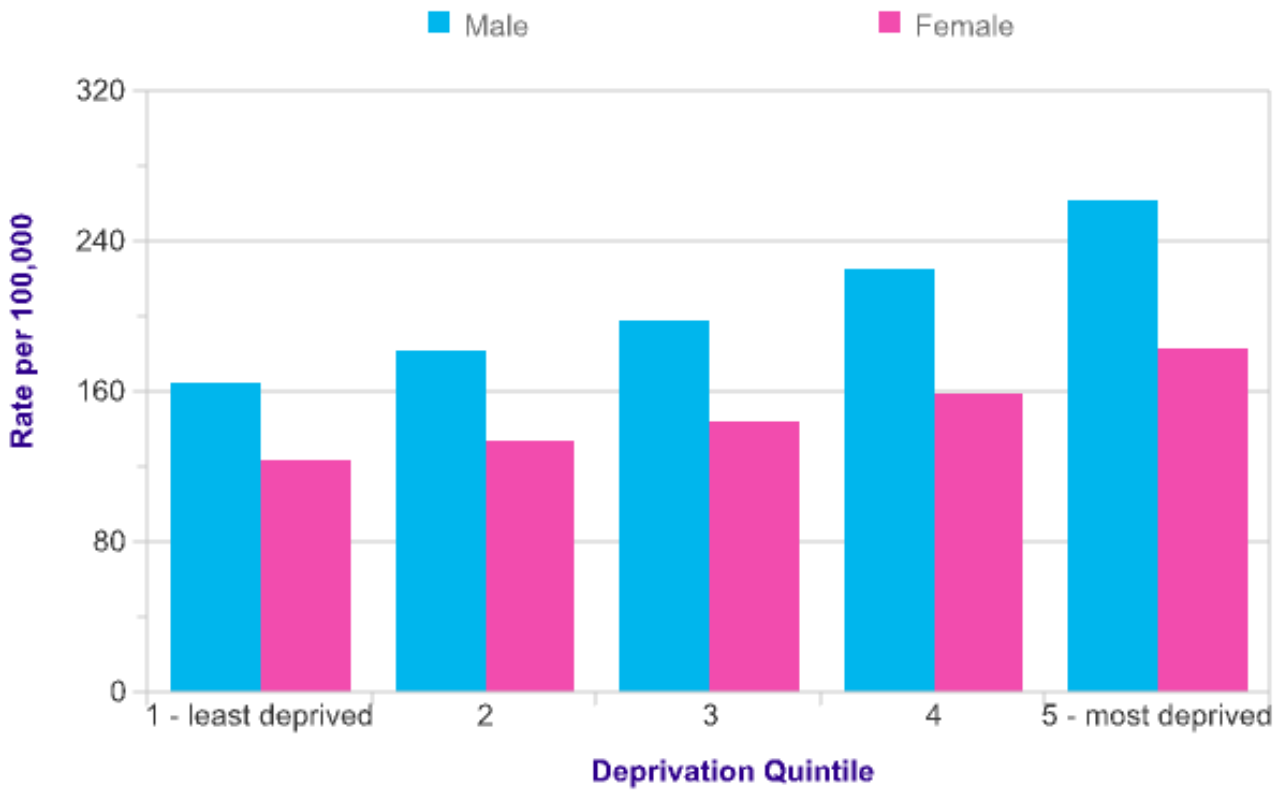
Organizzazione, risorse e qualità nella strategia INT
2 e 3 marzo 2018
Villa Gallarati Scotti, Oreno di Vimercate

ABSOLUTE INEQUALITIES IN CANCER MORTALITY, men, ca. 2010

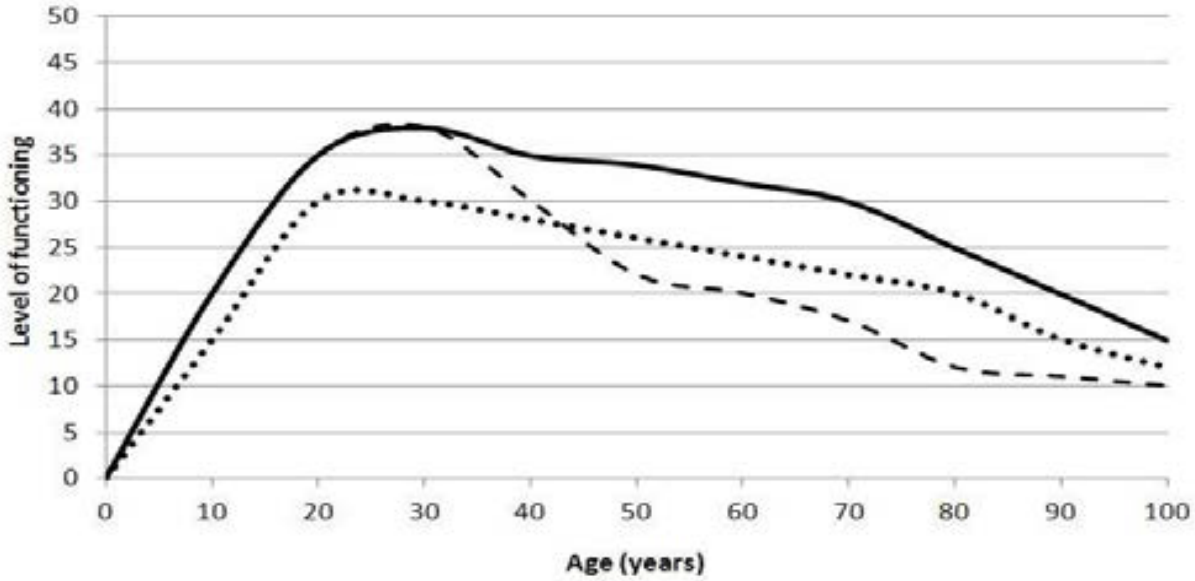


ABSOLUTE INEQUALITIES IN CANCER MORTALITY, women, ca. 2010

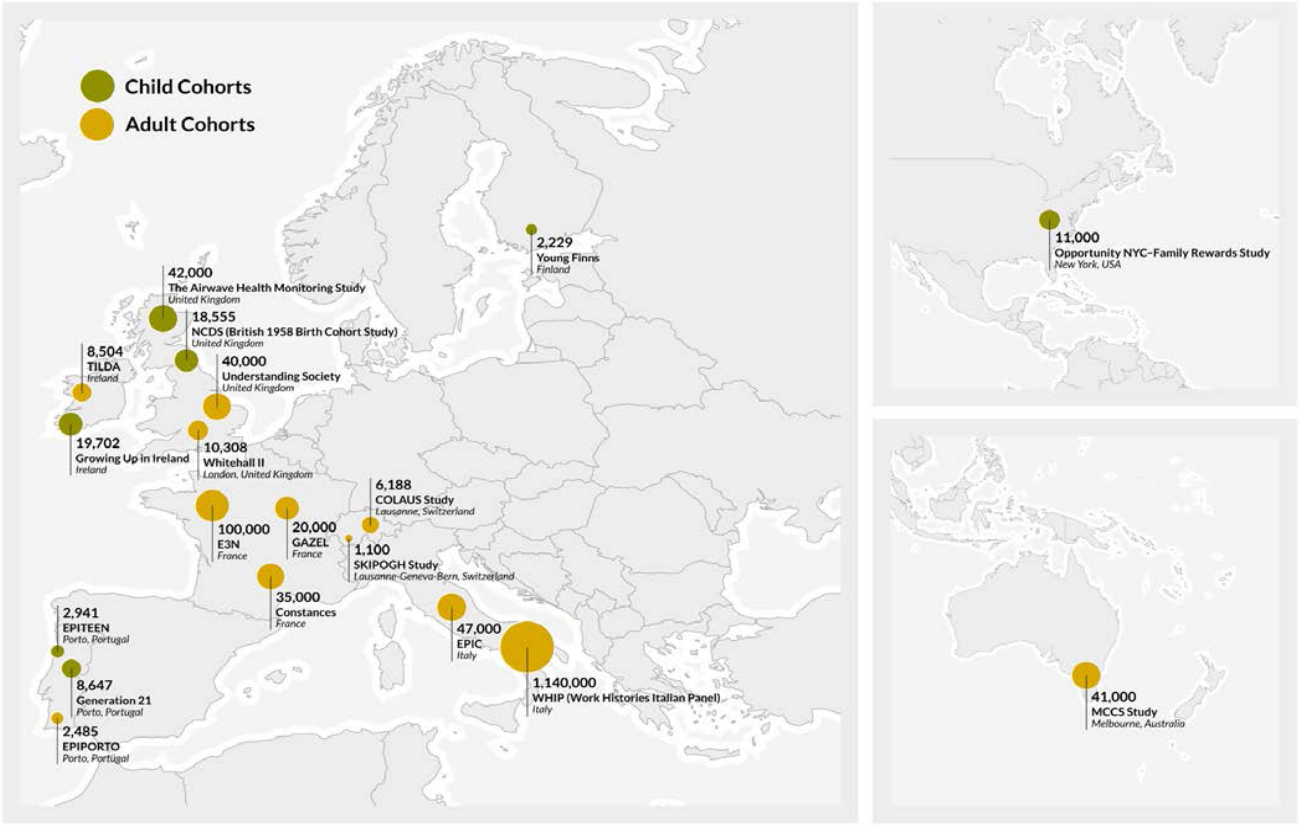




All Cancers Combined Excluding Non-Melanoma Skin Cancer (C00-C97 Excl. C44), European Age-Standardised Mortality Rates by Deprivation Quintile, England, 2007-2011. Source CRUK



H2020 Lifepath - The life-trajectory model of ageing implies a «build-up» phase and a «decline» phase

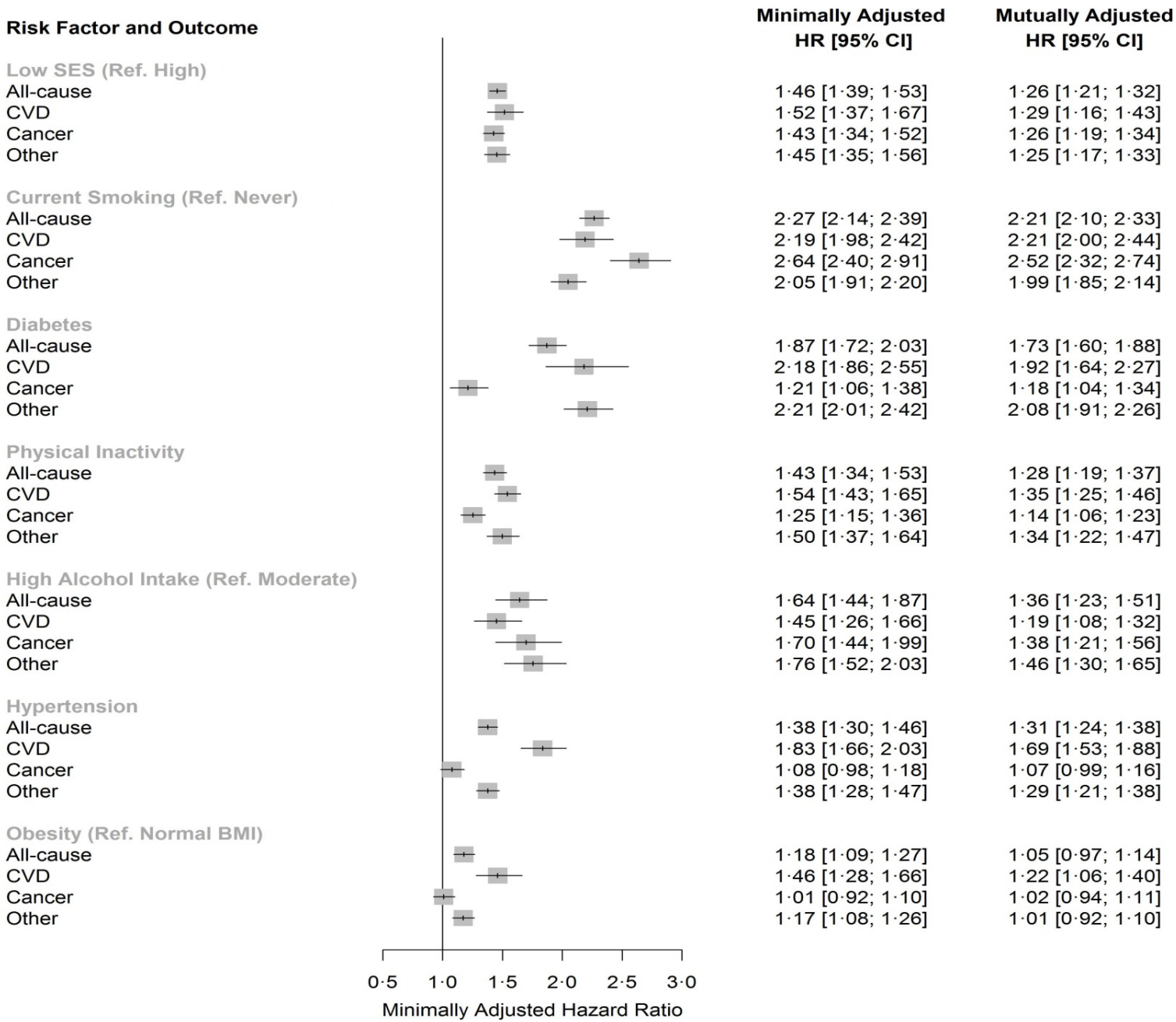


Lifepath: Mortality or functional outcomes

All estimates are adjusted by 25x25 risk factors for non-communicable diseases (obesity, hypertension, smoking, diabetes, physical inactivity, alcohol intake).

Effect of SEP on long-term outcomes: Years lost (of life or function)

	Low SEP vs High SEP	
Mortality	2.6 men, 1.5 women	(Stringhini et al, Lancet 2017)
Walking speed	6.6 men, 4.6 women	(Carmeli et al, BMJ accepted)



Stringhini et al, Lancet 2017 Mar 25;389(10075):1229-1237

Impact of SEP on blood markers. OR=odds ratio

	Low SEP	High SEP
Inflammatory transcriptome score, OR (a, b)(Castagne et al, 2016)		
EGM dataset	3.16 (p=0.04)	1.0 (ref)
GSE15180 dataset	3.00 (p=04)	1.0 (ref)
Methylation age acceleration (yrs)		
(Fiorito et al, 2017)	0.99	ref

(a) father's occupational position, based on logarithm of beta coefficient, fully adjusted model (b) in two different cohorts

Impact of SEP on EBV infection. Odds ratio for being infected at three years old and 95% CI. (Gares et al, 2017)

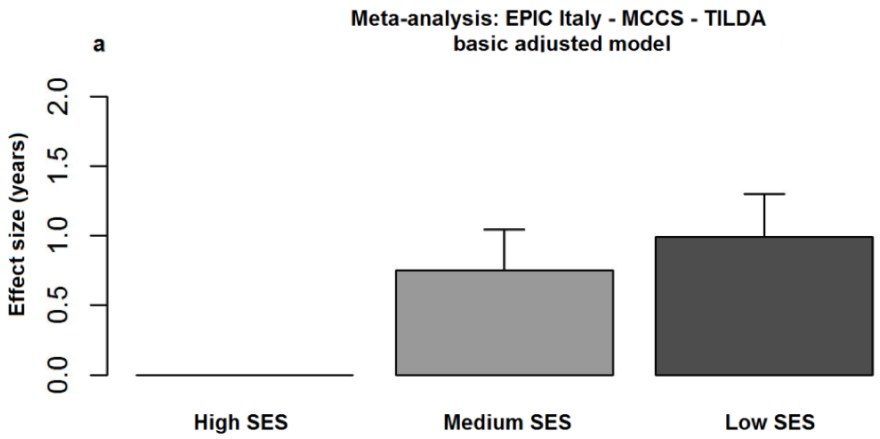
	Low SEP	High SEP
Social class V vs I	1·24 (1·02–1·50)	1.0 (ref)

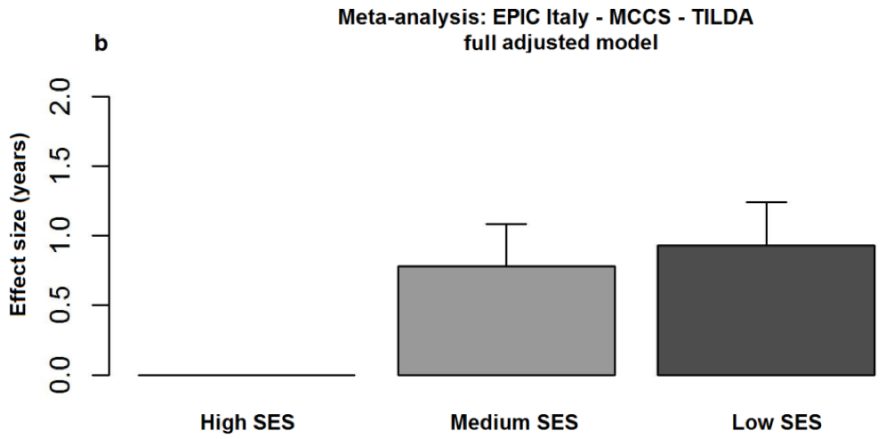
Epigenetics: biological clocks in Lifepath

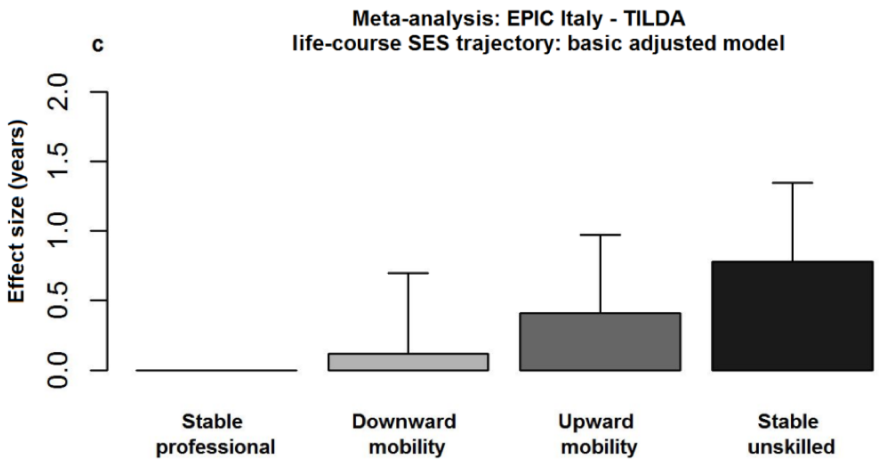
- Horvath developed the DNA methylation clock to predict age with high accuracy using 353 CpG sites

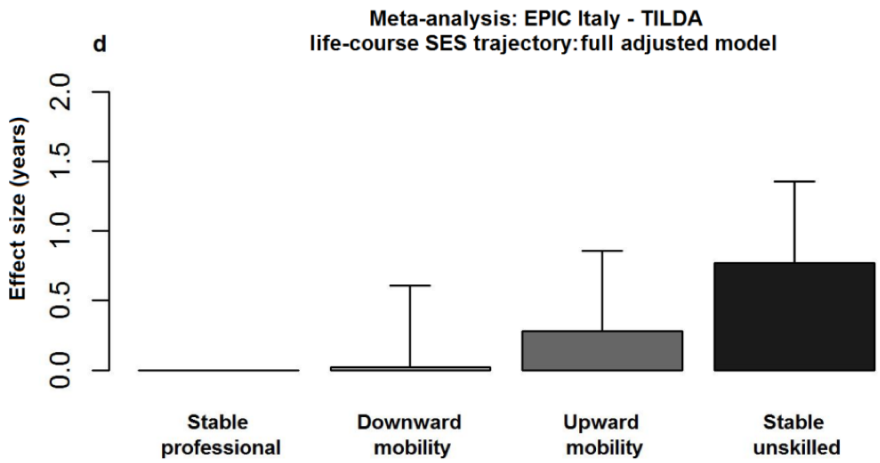
- From this Age Acceleration may be derived as a discrepancy between methylation age and chronological age

Association of SES with age acceleration (AA)







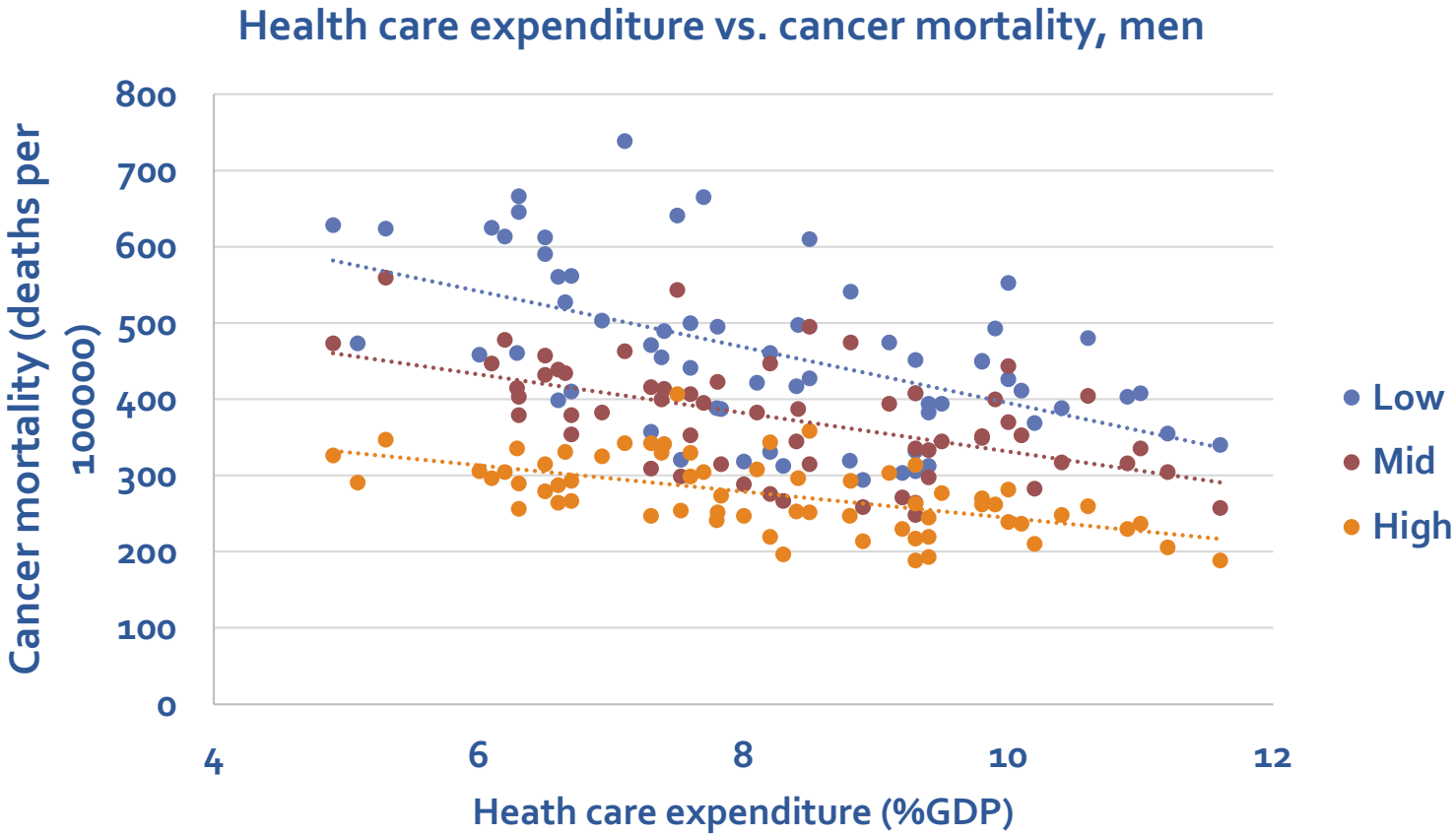


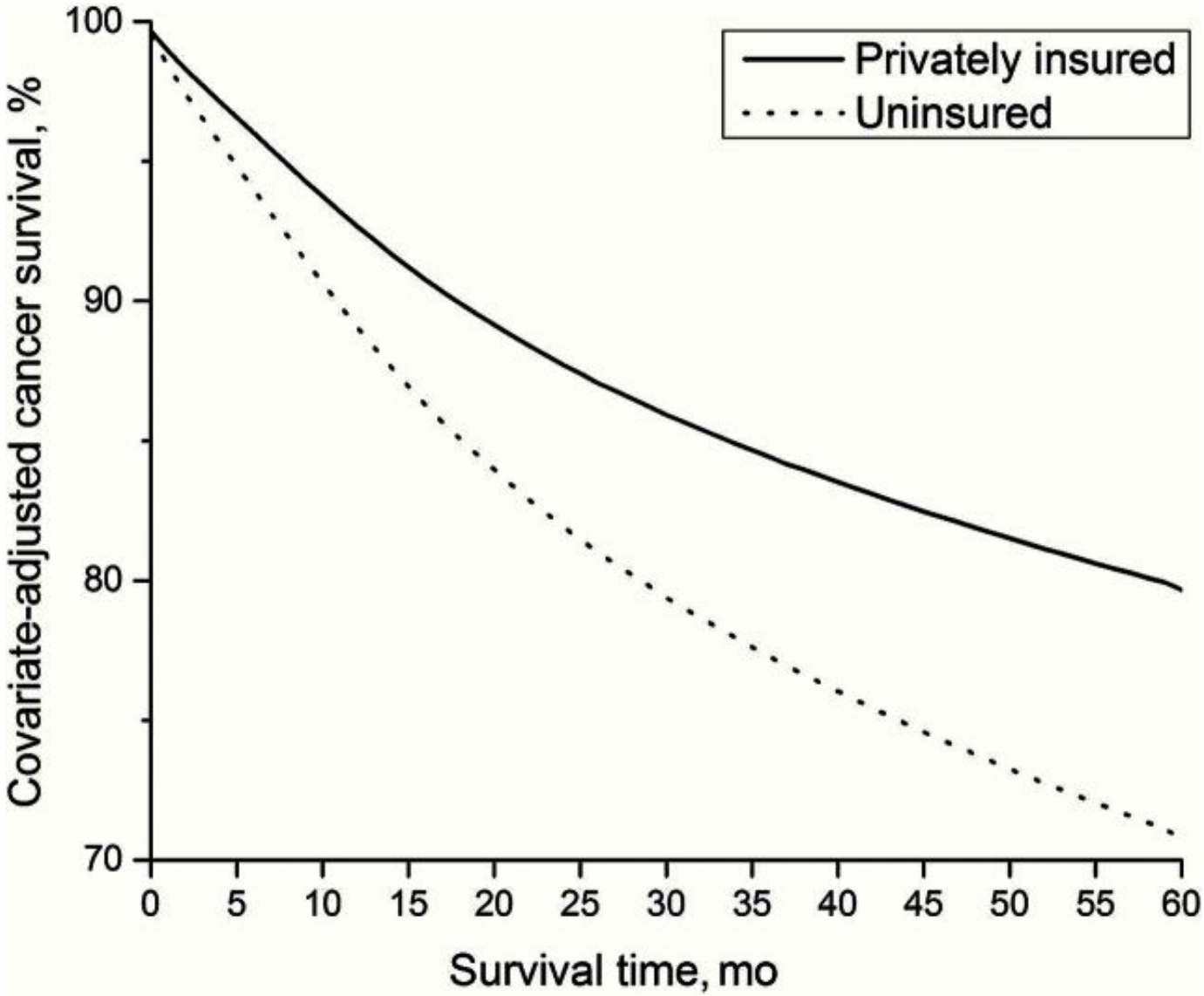
- Around half of cancers could be prevented by applying the knowledge we have;
- The majority of cancers have a lifestyle or environmental cause, so the potential for prevention is much higher

Vineis P and Wild CP (2014) The Lancet, 383: 549-557

Bray F, Jemal A, Torre LA, Forman D, Vineis P.
J Natl Cancer Inst. 2015 Sep 30;107(12):djv273

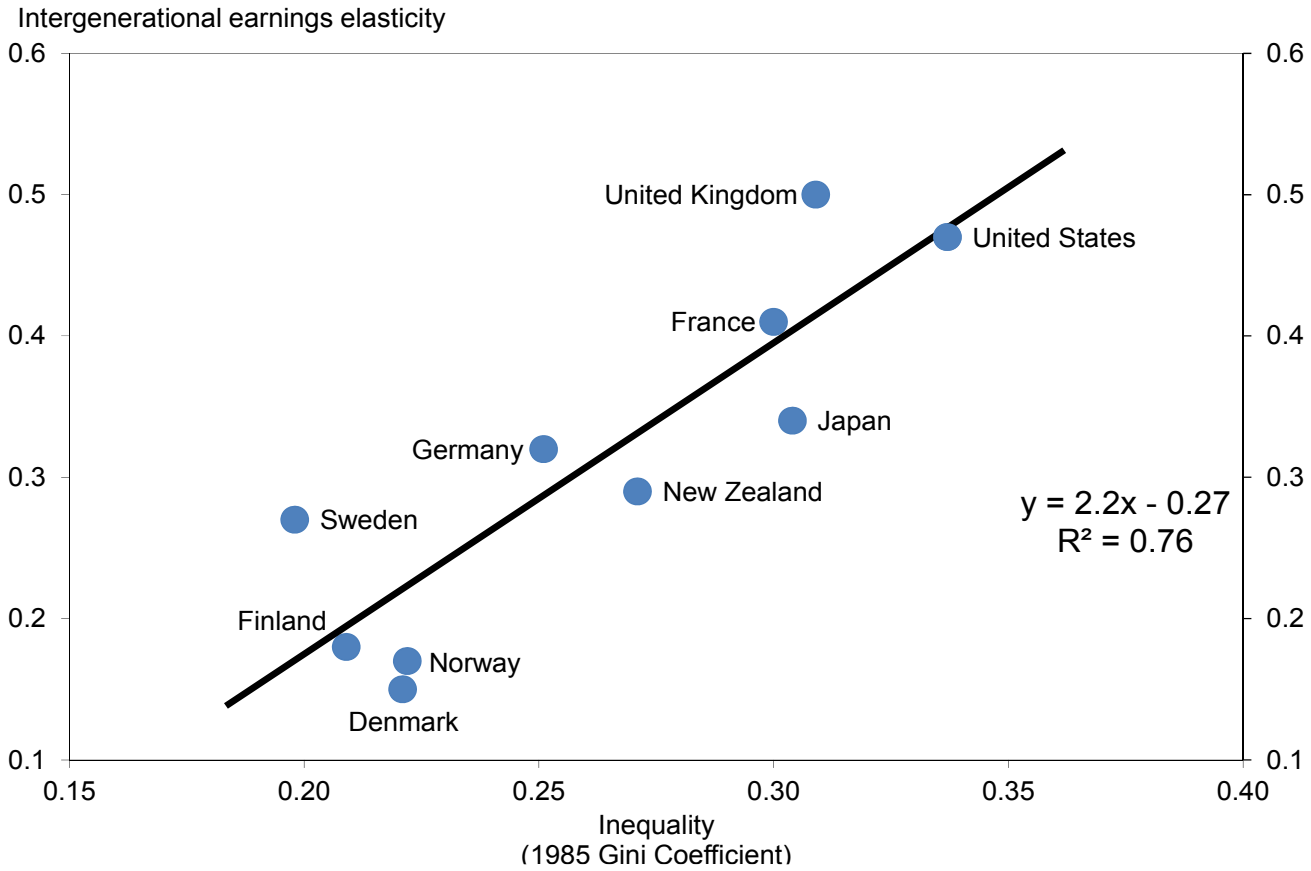
HEALTH CARE EXPENDITURE AND CANCER MORTALITY, men, ca. 1980-2010





In the United States, cancer survival is lower for those without insurance compared with those with private insurance (from Cancer Atlas, American Cancer Society, Atlanta, GA, 2014)

Higher income inequality associated with lower intergenerational mobility



Source: Corak (2011), OECD, CEA estimates

From Lifepath research (courtesy J Mackenbach)

Faster relative decline of cancer mortality among the high educated illustrates their greater capacity to benefit from advances in prevention and treatment

Widening relative inequalities in cancer may be a largely inevitable by-product of mortality decline – policymakers should target absolute inequalities

Entry-points for intervention include poverty, smoking and health care access, but population level effects require large scale efforts

Cancer mortality is increasingly important as a component of health inequality, and cancer prevention and treatment policies should have a stronger equity focus

Thank you