Lifepath

HEALTHY AGEING FOR ALL

MRC-HPA Centre for Environment & Health

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Socioeconomic experiences in a life course context: the LIFEPATH project implementation and results

Paolo Vineis
Imperial College London

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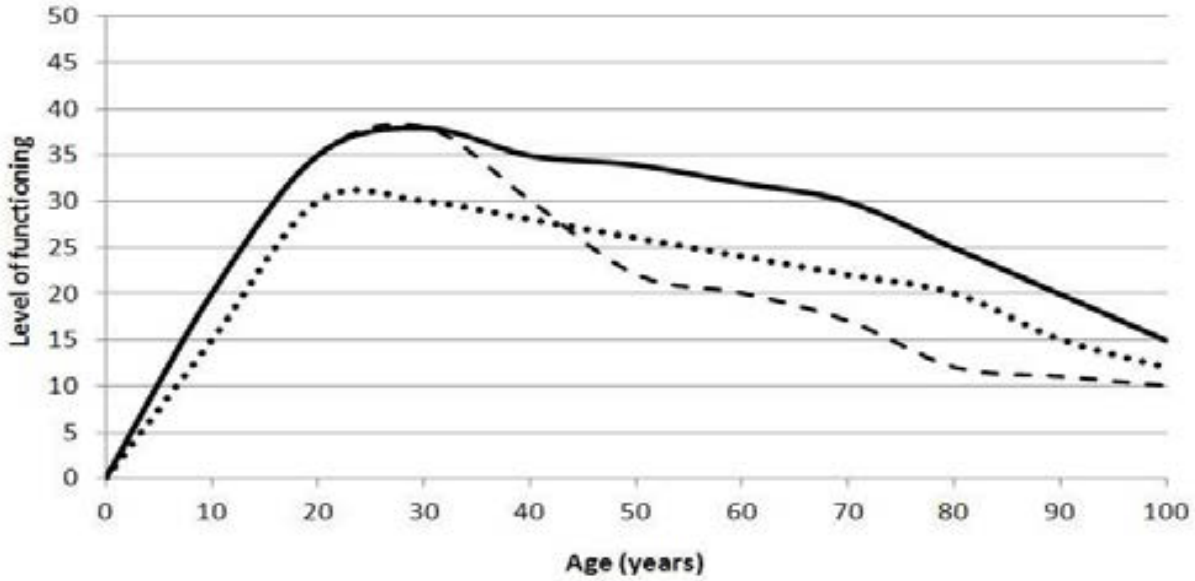
Goals of Lifepath

To show that healthy ageing is an achievable goal for society, as **it is already experienced by individuals of high socio-economic status (SES)**.

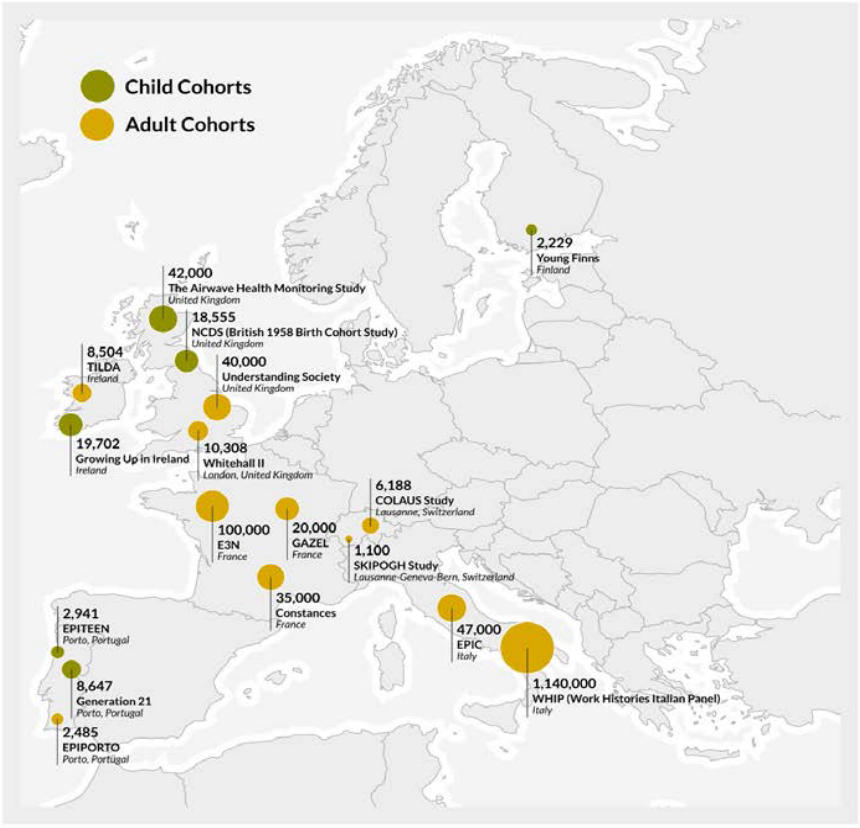
To improve the understanding of the mechanisms through which healthy ageing pathways diverge by SES, by investigating **life-course biological pathways using omic technologies**.

To examine the consequences of the current **economic recession** on health and the biology of ageing (and the consequent increase in social inequalities)**.**

To provide updated, relevant and innovative **evidence for healthy ageing policies** (particularly “health in all policies”)



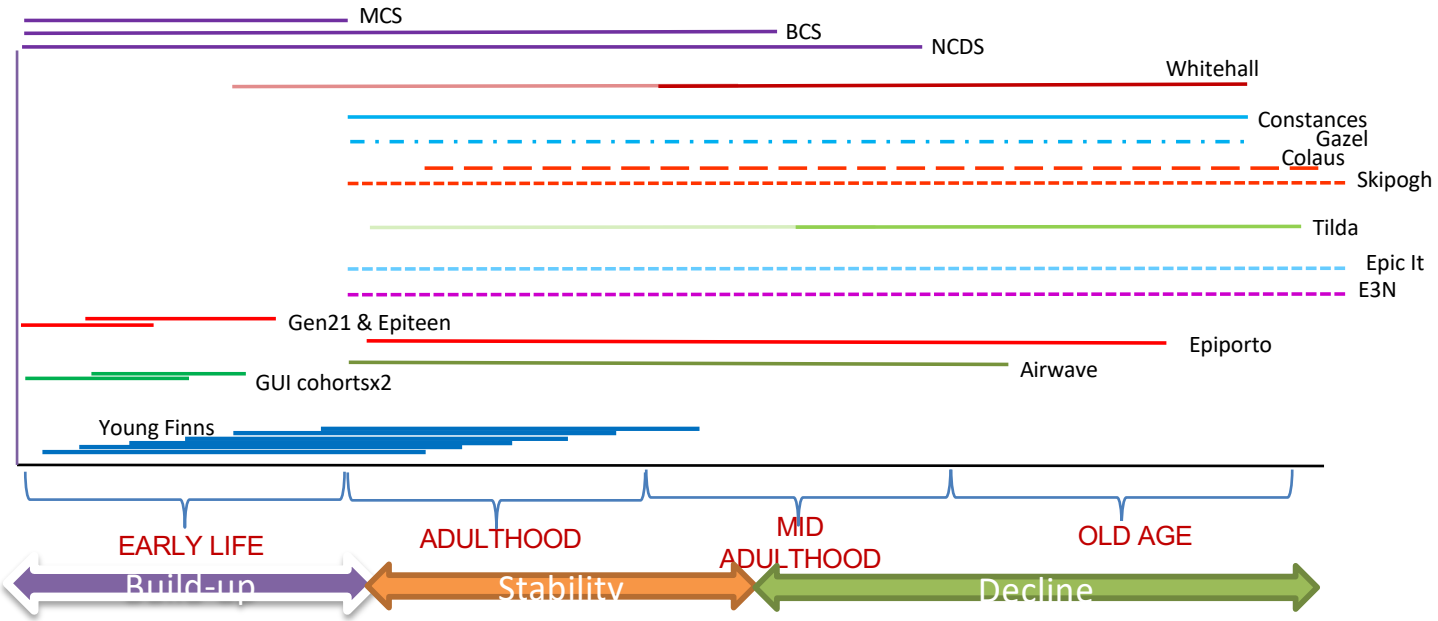
The life-trajectory model of ageing implies a «build-up» phase and a «decline» phase

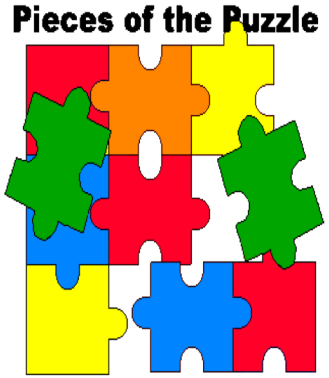


Embodiment & healthy ageing

Pieces of the puzzle helping us to understand the processes and mechanisms behind healthy ageing over the lifecourse

Evidence pieced together from Lifepath work…





A guide to Lifepath scientific results – highlights (see Factsheet)

Socioeconomic position is an independent risk factor, like smoking or hypertension (Stringhini et al, 2017 and 218)

The biology behind health inequalities (Castagne' et al 2016, Barboza Solis et al, 2016; Fiorito et al, 2017 and 2019; McCrory et al, 2019; Berger et al, 2019)

Early life is the game changer (McCrory et al, 2017; Layte et al, 2017; Kivimaki et al, 2018)

Effect of recession and austerity on inequalities (Mackenbach et al, 2018)

Also:

Lifepath statistical modelling suggests that trajectories towards poor health can be modified by acting both on intermediate risky behaviours and on social deprivation itself. The two types of trajectories seem to be complementary

(Lepage and Lang, presentation later today)

Outcome	Cohorts – exposure - units	Male	Female
Relationship between disadvantaged socio-economic conditions & long-term outcomes			
Mortality	48 cohorts - most disadvantaged vs most advantaged social position – Hazard Ratio (95%CI) (Stringhini, 2017)	1.42 (1.38; 1.45)	1.34 (1.28 ; 1.39)
Walking speed	37 cohorts - most disadvantaged vs most advantaged - Years of Life Lost by age 60 (95%CI) (Stringhini, 2018)	4.8 (3.7 ; 6.5)	3.3 (2.5 ; 4.4)

Outcome	Cohorts – exposure - units	Male	Female
Relationship between socio-economic conditions & blood biomarkers			
Increase in allostatic load score	NCDS (UK) social class IV & V semi-unskilled vs I & II professional/managerial - β (95%CI) (Barboza-Solis, 2016)	0.32 (0.09 ; 0.54)	0.30 (0.06 ; 0.53)
	NCDS (UK) social class III skilled manual vs I & II professional/managerial - β (95%CI) (Barboza-Solis, 2016)	0.27 (0.09 ; 0.45)	0.29 (0.09 ; 0.49)
	NCDS (UK) social class III skilled non-manual vs I & II professional/managerial - β (95%CI) (Barboza-Solis, 2016)	0.05 (-0.19 ; 0.29)	0.12 (-0.14 ; 0.39)
Inrease in C reactive protein	Across 6 cohorts – Low vs high education level - β (95%CI) (Berger et al 2019)	0.13 (0.05 ; 0.21)	0.14 (0.04; 0.25)

Outcome	Cohorts – exposure - units	Males & Females	

Relationship between socio-economic conditions & blood biomarkers

Risk of Infection with Epstein Barr Virus	MCS (UK) aged 3 -most disadvantaged social class vs most advantaged - OR (95%CI) (Gares V, 2017)	1.24 (1.02 ; 1.50)
Epigenetic age acceleration (methylation)	3 cohorts - intermediate social class vs advantaged increase in number of years (Fiorito, 2017)	0.75 (0.17 ; 1.39)
	3 cohorts - disadvantaged social class vs advantaged increase in number of years (Fiorito, 2017)	0.99 (0.39 ; 1.59)
Inflammatory transcriptome score	EPIC-Italy - disadvantaged father's occupation vs advantaged - β (95%CI) (Castagne, 2016)	0.35 (0.04 ; 0.66)

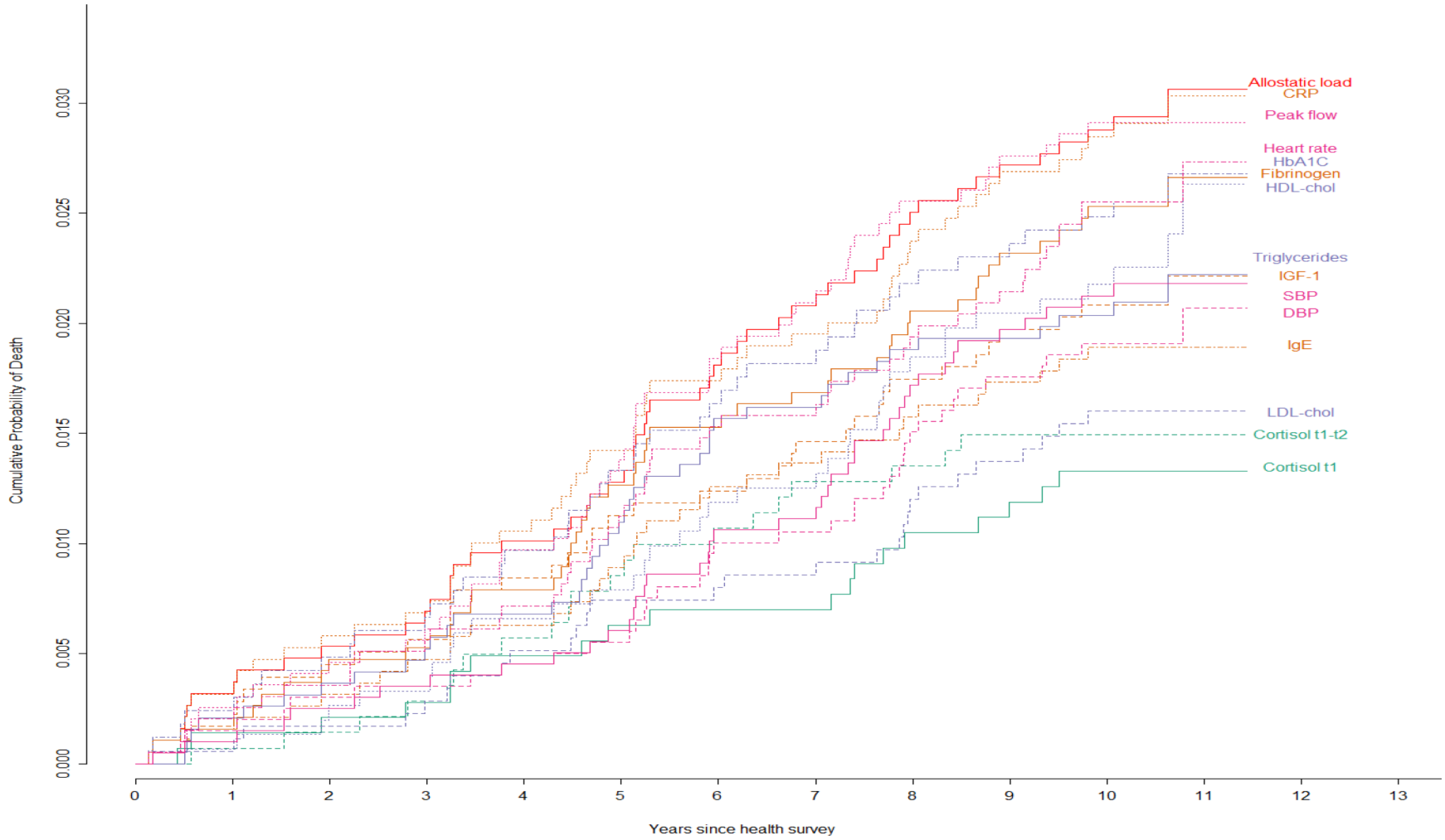
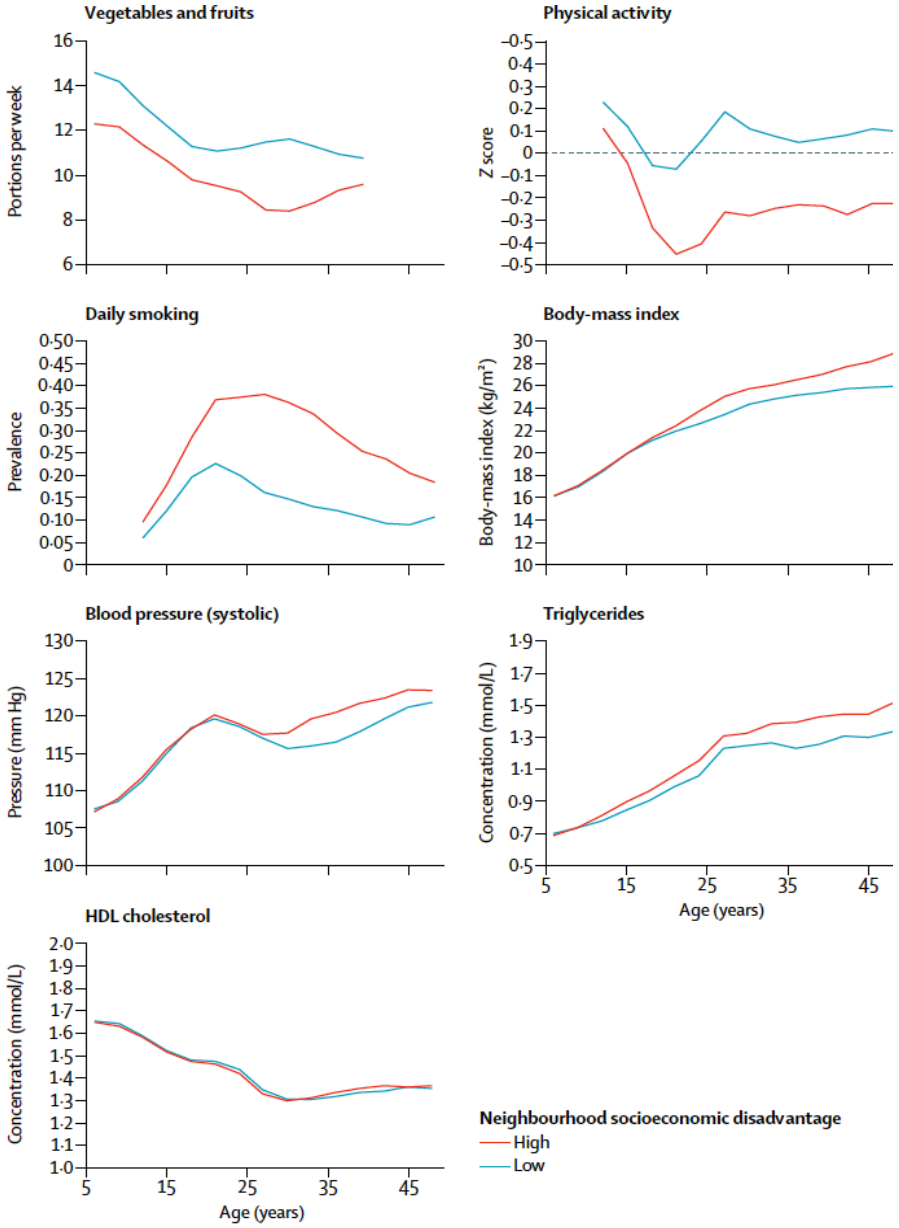


Figure - Relationship between cumulative mortality and the biomarkers used to create the allostatic load score (Castagné et al. 2018)

Red = low SES
Blue = *high SES*



gure 2: Risk factors of cardiometabolic health by age and cumulative neighbourhood socioeconomic isadvantage

he cutoff for high neighbourhood socioeconomic disadvantage is >0·5 SD above the national mean and the utoff for low neighbourhood socioeconomic disadvantage is more than or equal to 0·5 SD below the national ean. Data for those with intermediate low and high neighbourhood socioeconomic disadvantage are given in

Socioeconomic disadvantage characterised by

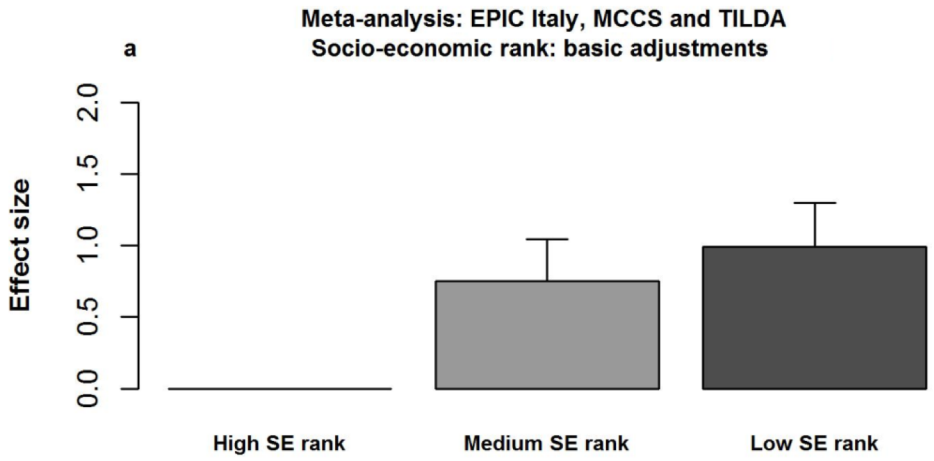
- **Less healthy diet** at **age 6**,
- **Decreased physical activity** and increased prevalence of **smoking** from adolescence (**12-15y**) onwards
- Differences in **triglycerides (15y), BMI (20y), blood pressure (25y)** in adolescence and adulthood

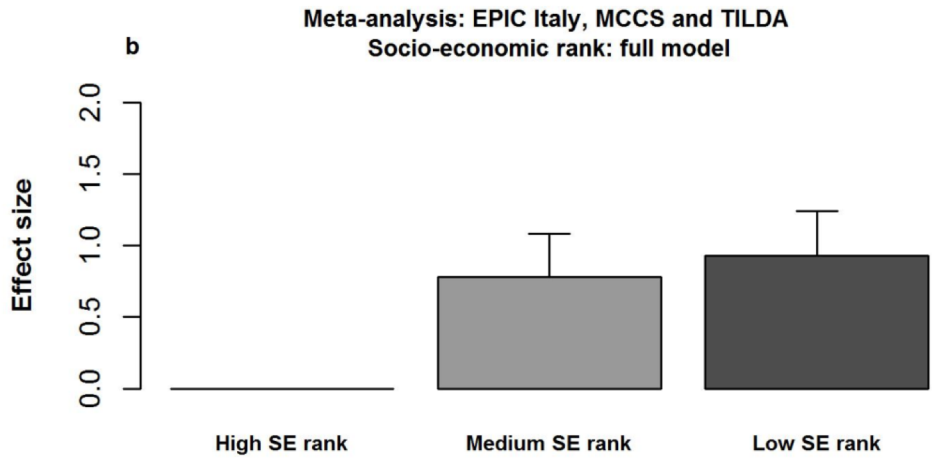
Kivimaki et al. *Lancet PH* 2018

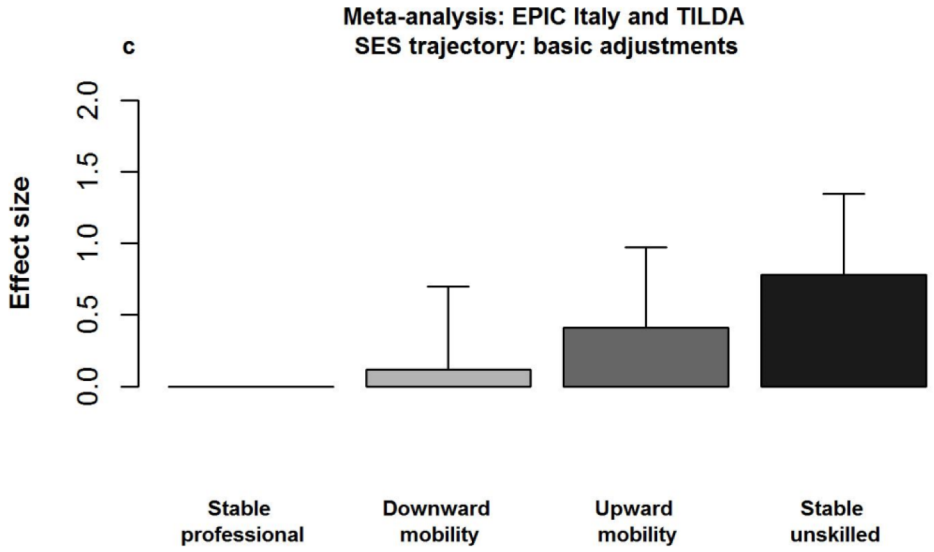
Epigenetics: biological clocks in Lifepath

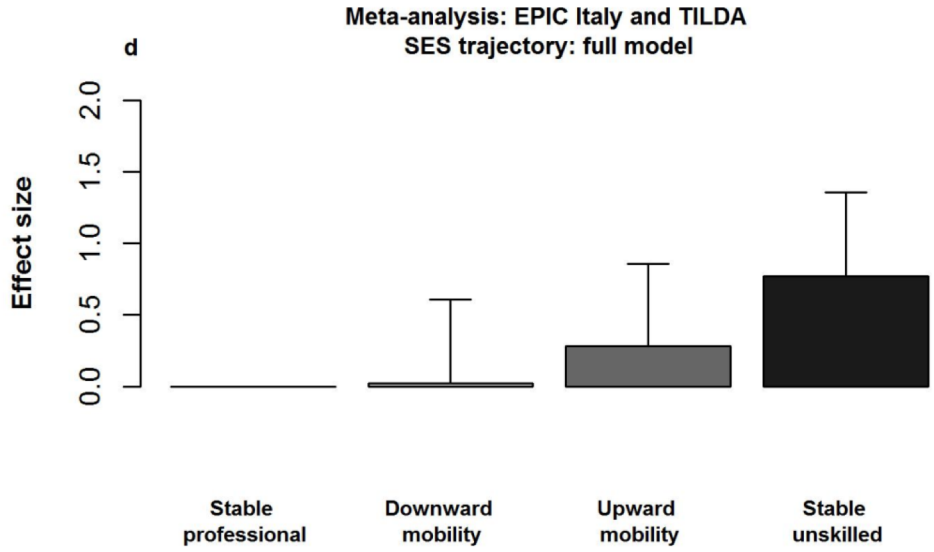
- Horvath developed the DNA methylation clock to predict age with high accuracy using 353 CpG sites
- From this Age Acceleration may be derived as a discrepancy between methylation age and chronological age
- Other clock were further developed (Levine) and proved more effective

Age acceleration based on DNA methylation in EPIC Italy, MCCS and TILDA









Fiorito G, 2017.

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