Lifepath
HEALTHY AGEING FOR ALL

For Journalists

Healthier ageing for all: evidence from Lifepath Project

Governments are increasingly aware of the impact of ageing on individuals, communities, and health and social care services. Poorer people are more likely to experience worse health throughout the course of their life, especially in older age. The risk of poor health tends to decline with step-by-step increases in socioeconomic position, creating what has come to be known as a social gradient in health. In theory, if the more affluent can achieve healthy ageing it should be possible to achieve healthy aging for all.

Socioeconomic position is an independent risk factor, like smoking or hypertension

Noncommunicable diseases – such as cardiovascular diseases, cancers, chronic respiratory diseases and diabetes – are shaped by economic, social, environmental conditions, injustice and patterns of inequality. They share several common attributes such as chronicity, global burden and a preventable nature (Vineis 2017), and are linked to common risk factors, namely smoking, high alcohol use, poor diet, physical inactivity, raised blood pressure, high salt consumption and diabetes (WHO 2013). Lifepath has indicated that socioeconomic position (SEP) is an independent risk factor for mortality and physical functioning (Stringhini 2017; 2018).

Mediating factor	Years of life lost (YLL)
Alcohol (high use)	0.5
Diabetes	3.9
Hypertension	1.6
Obesity	0.7
Physical inactivity	2.4
Smoking	4.8
SEP	2.1

Years of Life Lost associated with 6 major risk factors and low SEP (Stringhini et al., 2017). Low SEP was associated with 2.1 years of life lost (YLL) between ages 40 and 85 years and was comparable with YLL from the other six risk factors.

The Lifepath project

Lifepath is a research consortium funded by the European Commission under Horizon 2020, which aims to understand the impacts of socioeconomic differences on healthy ageing with a life-course approach that considers the relative importance of lifetime effects by comparing studies on childhood and adult risks. Lifepath researchers have integrated Europe-wide data on socioeconomic position, environmental exposures and behavioural risk factors with health and other biological measurements (Vineis 2017). They investigated the biological imprints left in our bodies by exposure to socioeconomic factors – such as education, occupational title, or income. Chronic psychosocial stress was also considered as it may exert long-term effects through inflammatory responses, reduced immune function and biological age acceleration. The evidence from Lifepath can help to steer policies to promote health, showing that healthy ageing is an achievable goal for society.

Click here for a larger version of the map.

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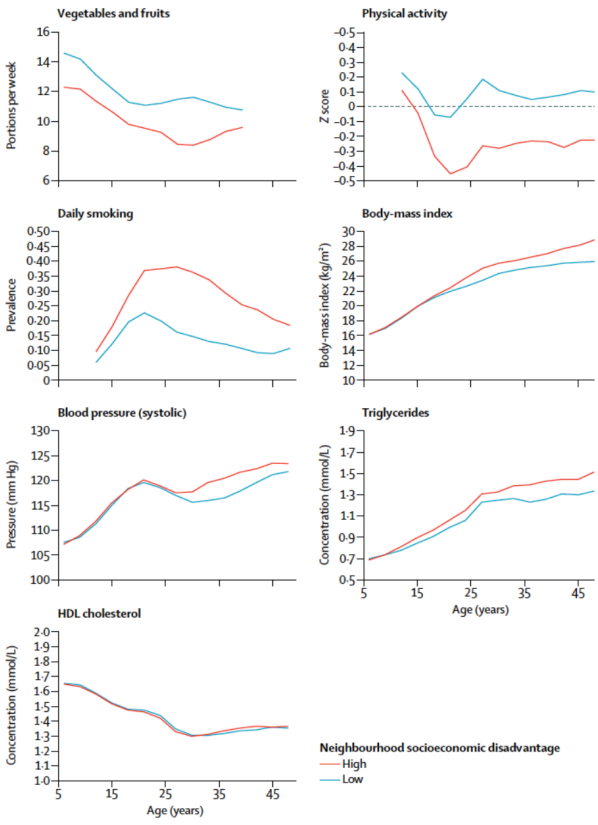
The biology behind health inequalities

Lifepath also studies the molecular and physiological processes underlying the social-to-biological transition of health inequalities. We studied epigenetics, inflammatory markers, allostatic load and metabolomics.
Social disadvantage in early life may cause persistent biological changes such as increased inflammation that can lead to a range of chronic health conditions such as cardiovascular disorders, asthma and cancer (Castagné 2016).
Low socioeconomic position (SEP) can create chronic psychosocial stress with long-term effects through physiological wear-and-tear involving inflammatory responses, reduced immune function and acceleration of ageing (McCrory 2019, in press). Biomarkers can be used to explore the impacts of income inequality.
More unequal societies are thought to produce higher levels of stress in response to 'status anxiety' at the individual level (Layte 2019)
Lifepath analysis indicated that lower maternal education and manual paternal occupation were associated with a higher (worse) allostatic load at 44 years (Barboza Solis 2016).
Lifepath results showed that differences in SEP are revealed in the DNA of our cells. DNA methylation is used to represent overall biological ageing and has been linked with educational attainment of individuals (Fiorito 2017). Low SEP was associated with greater accelerated ageing.
Though the whole life-course is relevant to unhealthy ageing, early life is considered crucial in embedding social inequalities in biology (as shown by the relevance of ACEs and early life allostatic load).

Early life is the game changer

Lifepath indicates that socioeconomic circumstances affect health from the very beginning. Lifepath researchers assessed the relationship between socioeconomic position (represented by maternal education) and obesity by analysing data on body mass index from over 41,500 children in four prospective cohort studies. (McCrory 2017). Infants, children and adolescents from low SEP backgrounds were more likely to be overweight, having a higher BMI from as young as the age of three. Low SEP in early life may shape lifestyle and health-related behaviours, which then affect health in adulthood (Kivimaki 2018).

Psychosocial stress is also a key factor, since it is thought to affect brain development in childhood by affecting glucocorticoid and catecholamine levels. Low socioeconomic conditions in childhood may result in educational disadvantage, which in turn drives economic disadvantage in adulthood (Layte 2017).



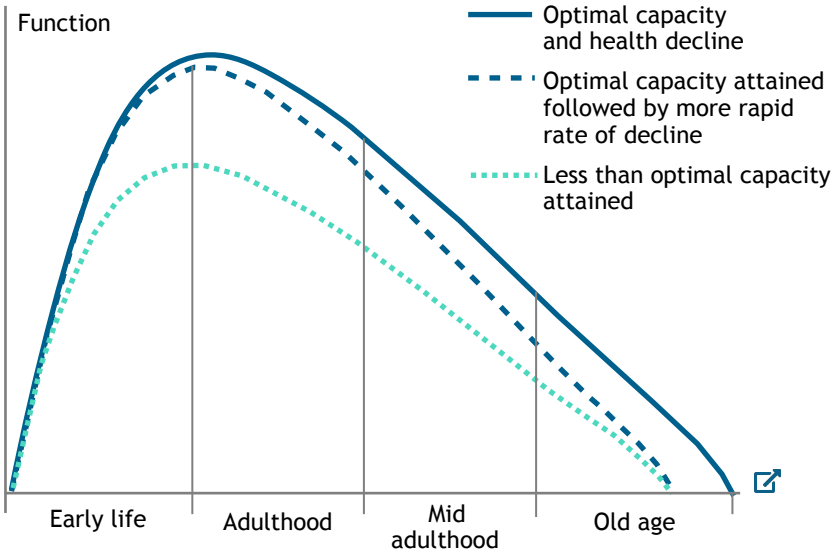
Risk factors of cardiometabolic health by age and cumulative neighbourhood socioeconomic disadvantage.

Effect of recession and austerity on inequalities

One of Lifepath's goals was to assess the impact of the 2008 recession in Europe. Lifepath researchers completed a trend study of health inequalities in 27 European countries which included the period of the 2008 banking crisis. Most European countries have experienced many decades of mortality decline and the evidence suggests this was not derailed by the recession. However, mortality from smoking-related causes increased for younger less educated women and mortality from alcohol-related causes went up among less educated men and women. This study likely reflects a level of resilience in most European countries built up through the provision of financially accessible health care and social support systems (Mackenbach 2018).

Policy interventions to reduce inequalities

The evidence from Lifepath is that interventions to reduce health inequalities are needed both in childhood, to support healthy ageing through the whole course of life, but also later in life, to help people who are already in middle or old age and who are ageing in poverty or who need help to address their large disadvantage in functioning. Each stage of life requires different interventions that take into account context, timing, cross-generational links, and other aspects including agency and opportunity.



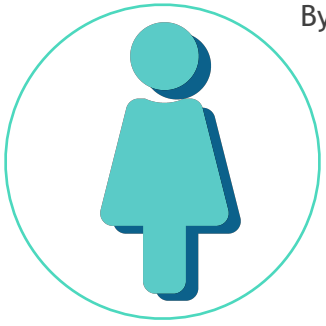
Early Life

Poor health trajectories related to low socioeconomic position start in early life and are well established by age three. Lifepath evidence also shows that investment in a child's early years could be more effective and cheaper than later interventions (Doyle 2009). Low income families are vulnerable, especially in periods of recession, and governments should maintain the living standards of families with children. Building and maintaining human capital in childhood and adulthood is essential.

Early adulthood

Young adults with disadvantaged social characteristics already show a higher biological risk compared to their more advantaged counterparts (Karimi 2019, in press) and this is likely to be exacerbated by health behaviours. Moreover, living in deprived neighbourhoods is associated with differences in health risks across the course of life. Most of all, the effects of early life social disadvantage on biology may amplify from early adulthood by age 25 (Kivimaki 2018). Addressing social exposures and health behaviours early in adulthood can limit their long-term effects and mitigate amplifications.

Mid adulthood



By mid adulthood, a social patterning is observed in premature mortality (Stringhini 2017), physical functioning (Stringhini 2018), physiological wear-and-tear (Castagné 2016; Berger 2017), and in molecular processes including epigenetic age acceleration (McCrory 2017; Fiorito 2017) is observed. All these are also mediated by smoking, BMI and metabolic disorders, such as fatty liver and diabetes (Kivimaki 2018).

Key policy messages

- Lifepath indicates that *socioeconomic position is an independent risk factor for premature death and physical functioning*. A low socioeconomic position encourages the uptake of well recognised risk behaviours such as smoking, high alcohol consumption, a diet low in fruit and vegetables.
- *Lifepath studies also looked at biological markers* that explain how social disadvantage is embedded in our bodies from the outset. Literally, "poverty gets under the skin".
- *Poor health trajectories related to low socioeconomic position start in early life* and are well established by age three. However, appropriate policies can reverse the embodiment of socioeconomic disadvantage, resulting in healthier ageing. It is thus important to intervene from early age development through adulthood in order to maintain healthy ageing.
- 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.
- In addition to behavioural environmental and occupational exposures, Lifepath epidemiological and mechanistic understanding indicates that *psychosocial stress*, particularly among children and vulnerable adult groups, *is likely to be a key factor in the establishment of health inequalities*.
- For policy purposes, the points above suggest (a) that the effects of prevention **interventions in early life are complementary to interventions in adulthood**; (b) that intervening in poor socioeconomic conditions is complementary and quantitatively comparable to modifying risk factors; (c) that **more needs to be done to attenuate psychosocial factors** in addition to material factors.
- Based on its studies, **Lifepath cannot give indications on specific policies, but can give some useful suggestions about the right timing of interventions** and the necessity of an integrated approach to healthy ageing.

Conclusions

Evidence from the Lifepath project suggests that socioeconomic circumstances should be included in the list of risk factors targeted by global health strategies as their impact on mortality is comparable in strength and consistency to that of well-known risk factors like smoking, alcohol consumption, obesity and hypertension. Also, poor health trajectories related to low socioeconomic position start and are already well established in early life. Lifepath research highlighted biological processes through which socioeconomic disadvantage literally gets under the skin.

Interventions to reduce socioeconomic adversity as well as the behavioural risk factors highlighted are needed to address non-communicable diseases. The whole life-course is relevant, but probably early life is more so. Also, more needs to be done to attenuate psychosocial factors in addition to material factors. Lifepath statistical modelling suggests that trajectories towards poor health can be modified by acting both on intermediate risk factors and on social deprivation itself. What is also emerging from different lines of research is that mitigation and prevention policies need to be adapted to contexts, i.e. **there is no single intervention model that fits all populations**. This has important implications for policy making, since appropriate policies can reverse the embodiment of socioeconomic disadvantage, thus reducing health inequalities and resulting in healthier ageing.

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