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# **The life-course construction of social inequalities in health in old-age**

PhD Project Description

Bernadette W.A. van der Linden

Faculty of Social Sciences (demography), University of Geneva

## **1. General outline**

The increase in life expectancy has been widely studied in demography. In developing countries, this rise is mainly a result of mortality reductions at younger age and mortality related to infectious diseases, whereas in developed country this is due to declining mortality at older age (1). Due to the ageing of the population, improved living standards, and scientific advances, more people are reaching older ages. With this increase in life expectancy, an important question is whether the added life years are lived in a healthy state. People in good health are better able to stay part of society than those suffering from declines in their physical and mental health. Therefore, there is a need for individuals as well as for the society as a whole to better understand ageing.

Biologically, ageing can be regarded as the accumulation of molecular and cellular damage, which over time leads to increased risk of disease and a decline in the capacity of an individual (1). However, differences in, amongst others, genetics, health behaviours such as exercising or smoking, and environmental factors such as living in polluted areas, lead to a different ageing process for every individual. Healthy ageing is a concept that is often used to distinguish between disease-free, healthy versus unhealthy individuals. Given that many people at older age have health conditions that may have only little influence on their functioning, the World Health Organization defines healthy ageing as 'the process of developing and maintaining the functional ability that enables well-being in older age' (1). Functional ability includes the individual's physical and mental capacities, contextual factors such as built and social environment, and interactions between the individual and their environment.



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One of the key factors by which health varies is socioeconomic position, which can be measured by education, occupation, or income (2). Health inequalities between people from a high versus a low socioeconomic position have been shown to be between 5 and 10 years difference in average life expectancy at birth, and between 10 and 20 years in disability-free life expectancy (3). Even in developed welfare states, where a reduction of inequalities in income, living conditions, and access to services took place, socioeconomic inequalities in health are still present and even widening (4). A series of general theories have been brought forward to explain the persisting impact of socioeconomic inequalities. In sociology, the major frame refers to the systems of social stratification that consist of three components that can further be used to see mechanisms that underlie health inequalities (4). First, social mobility sorts individuals into different strata, with corresponding personal characteristics. Second, distribution of material and immaterial resources differs between the strata. Third, some resources are seen as more valuable in one strata than in another, which may be related to health promotion.

Mackenbach identified nine theories that may help explain socioeconomic inequalities in health; the three general theories identified are of particular interest for this PhD (4). The first theory of mathematical artefact suggests that 'increasing relative inequalities in health outcomes are inevitable when the overall level of the outcome falls' (4). The second theory is fundamental causes, which suggests that social forces that underlie the social stratification, such as knowledge, money, and prestige, are the cause of health inequalities. The third theory is the life course perspective, which suggests that health at older ages is partly determined by early life conditions as well as the trajectories and pathways that people then take through the various areas of their lives.

Adopting the relatively holistic approach of the life course perspective when studying ageing can provide insights into different pathways and the role trajectories and life events play in health in later life. For example, childhood socioeconomic conditions could have a long lasting effect on health in later life, beyond socioeconomic conditions in adulthood. This would suggest that health inequalities are related to both childhood and adulthood socioeconomic conditions. Alternatively, it allows for testing whether childhood socioeconomic conditions channel individuals into life course trajectories leading to social destinations or pathways, thus



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suggesting that childhood socioeconomic conditions are the actual determinant of health at older age, over adulthood socioeconomic conditions.

## **2. Short theoretical background**

In my thesis, I will rely on three bodies of literature; first, health in older age; second, social gradients/social stratification in health; and third, a life course approach for explaining social gradients.

First, with an increasing life expectancy, increasing survival in older age, and falling fertility rates, populations are ageing rapidly. However, living longer does not automatically mean that those added years in older age are lived in good health. Even though it is important for society and the individual, evidence that people live a longer healthier life is unclear (1).

Second, one of the most documented patterns in health is the social gradient: the relationship between a person's socioeconomic condition and their health. As already noted, multiple theories have been put forward to explain this phenomenon. Much empirical evidence has also been established. For example, poor socioeconomic circumstances during childhood have been shown to be associated with negative health outcomes during adulthood, such as higher risk of cardiovascular disease, lower quality of life, poorer physical capability, and higher mortality rates (5-10).

With the increase in life expectancy, an important question is who may be especially advantaged to having healthy years added, or inversely, who are the most vulnerable. However, examining only the direct effect of socioeconomic circumstances on health in later life might miss underlying associations and does not give any insights in possible pathways that may influence the association. That is why it is important to adopt a life course perspective to better understand different, possibly mediating, pathways that affect health in later life. In order to facilitate healthy ageing, it is important to identify promoters and barriers across the life course



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that can be targeted by health surveillance and strategies, thereby reducing the impact of unfavourable life conditions on health inequalities.

From a life course perspective, three theories on the relation between socioeconomic circumstances and health in later life can be considered. First of all, during developmental processes, biological systems are more sensitive to external influences (11). These sensitive periods take place mainly in early life, as this is the time in which most developmental processes occur. One study has shown that foetuses adapt to poor nutrient, which permanently changes their structure and metabolism, which leads to an increased risk of coronary heart disease, stroke, diabetes, and hypertension later in life (12). Recent research focused on cancer suggested that stressful conditions and adverse events in early life such as trauma, abuse, or maltreatment increase the risk of developing cancer in adulthood (13-15). A second theory refers to cumulative (dis)advantage, considering that (dis)advantage in early life leads to an accumulation of subsequent (dis)advantages (16). A study found that children who grew up in deprived circumstances had higher level of labour market disadvantage and lower quality of life in older ages (5). The third theory is related to social mobility, suggesting that risk associated to childhood disadvantage could be decreased or partially compensated for individuals moving from low childhood socioeconomic status to a higher status in adulthood (17). Evidence has shown that early-life social conditions are associated with health in later life. However, research on possible pathways that may explain this association is lacking.

### **3. Hypotheses**

Since evidence that people live a longer healthier life is unclear and research on possible pathways of socioeconomic conditions to health in later life is lacking, the hypotheses in my thesis are:

1. Disadvantaged early-life socioeconomic circumstances directly influence health in later life, which can be either positively (e.g. for frailty) and negatively (e.g. for some site-specific cancers), depending on risk factors for specific health conditions;



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2. Life trajectories (e.g. social mobility) and life events influence health in later life and have a mediating effect on the association between early-life socioeconomic circumstances and health in later life.

#### **4. Data & Methods**

The databases used in my projects include the Survey of Health, Ageing, and Retirement in Europe (SHARE), the Vivre-Leben-Vivere (VLV)-study, data from the Swiss National Cohort (SNC), the English Longitudinal Study of Ageing (ELSA), and data from the UK biobank. The statistical analyses used include, amongst others, Cox proportional-hazards regression and multilevel logistic regression to analyse associations, and sequence analysis to explore possible trajectories.

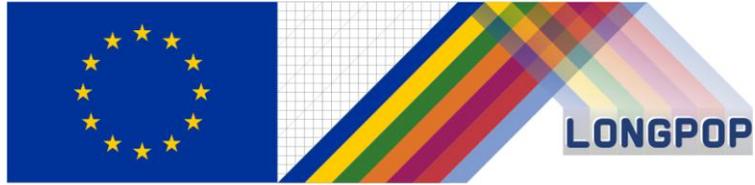
First, I will describe the importance of doing life course research in ageing by looking at the effect of socioeconomic conditions on different health outcomes in later life. Second, I will see how different life course indicators, such as socioeconomic conditions and environment, influence mortality. It has been suggested that socioeconomic position is associated with mortality and I will validate this for Switzerland by matching the VLV database with participants and their corresponding geo-codes with their area based socioeconomic position data provided by the SNC, using GIS software. Additionally, I will look into the influence of the environment on mortality in the United Kingdom. As far as I know, this will be the first time that the associations of different life course indicators with mortality will be studied using GIS software. This may be used in future studies to determine the influence of different life course indicators on health outcomes using maps. Third, after establishing that there is an effect of life course indicators on health, it is important to know the different pathways that may explain this. I will explain possible pathways in the life course that influence health in later life, such as critical life events, trajectories, and biological mechanisms. Using sequence analysis to examine the influence of trajectories on mortality risk is a novel way of doing so.

#### **5. Ongoing and projected papers**



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To describe the basis for life course research, two papers have already been written and submitted for publication:

- *“Life course precursors of frailty at older ages”*, in which we assess associations of childhood socioeconomic conditions with the risk of frailty in old age and whether adulthood socioeconomic conditions mediate this association.
- *“Effect of childhood socioeconomic conditions on risk of cancer in later life”*, in which we examine associations of childhood socioeconomic conditions with cancer risk in later life and whether this effect is mediated by adulthood socioeconomic conditions.

To see how different life course indicators influence mortality, the following paper is planned:

- *“The relation between socioeconomic position and mortality”*, in which we assess how socioeconomic position is related to mortality.
- *“Impact of environment on mortality”*, in which we assess the influence of the environment on mortality in the United Kingdom.

To explain what might influence health in later life by pathways, the following paper is planned:

- *“Are socioeconomic gradients in old age mortality mediated by life events?”*, in which we assess whether and to what extent critical life events (e.g. divorce, death of a partner, hospitalizations, unemployment) are mediating factors for socioeconomic gradients in mortality among people aged 65 and older in Switzerland.

## **6. Summary**

My research focuses on health in older age from a life course perspective. Given the multidimensionality of health, different dimensions that are of importance when studying ageing will be explored such as physical, mental, cognitive, and health-related well-being. Special attention in my work is given to the influence of social inequalities on health in older age.

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