Title: Socioeconomic Differences in Pathways to Death in Sweden

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Abstract: Research on socioeconomic inequalities in health often focuses on why some groups show greater improvements than others. The fact that we all face death and often a period of severe health decline at the end of life is overlooked. As a result, little is known about socioeconomic differences in end-of-life trajectories. Based on Swedish register data, we will fill this knowledge gap and analyze socioeconomic differences in pathways to death for all deaths at ages 60+ (approximately 90% of all deaths in Sweden each year) in the years 2018 to 2022. We will apply structural equation models to identify the latent types of end-of-life trajectories based on monthly information on health status, prescribed medications, monthly hours of elderly care, and other indicators that cover the last five years of life. In a second step, we will assess the socioeconomic differences within and across the end-of-life trajectory types. We will use disposable household-adjusted income as a measure for socioeconomic status. Preliminary results based only on the last year of life suggest a similar distribution of trajectory types across income quintiles but marked differences in their timing over age. By extending the observation period to the last five years of life, we however observe that people in the highest income quintile die in worse health than those in lower income quintiles. The preliminary results invite the hypothesis that socioeconomic differences in mortality at older ages are partly due to a slower dying process in the higher socioeconomic groups compared to the lower socioeconomic groups.

Background

The inevitability of death is a constant that is shared by all of us. However, the life course before death - the pathways to death - are not identical.[1] The example of dying after a serious illness compared with a sudden unexpected death illustrates this in a simplified way. In a previous study, we identified six different types of pathways to death based on the need for elderly care and

medical care in the last year of life.[2] The types are primarily distinguished by the need for elderly care and further differentiated by the need for medical care.

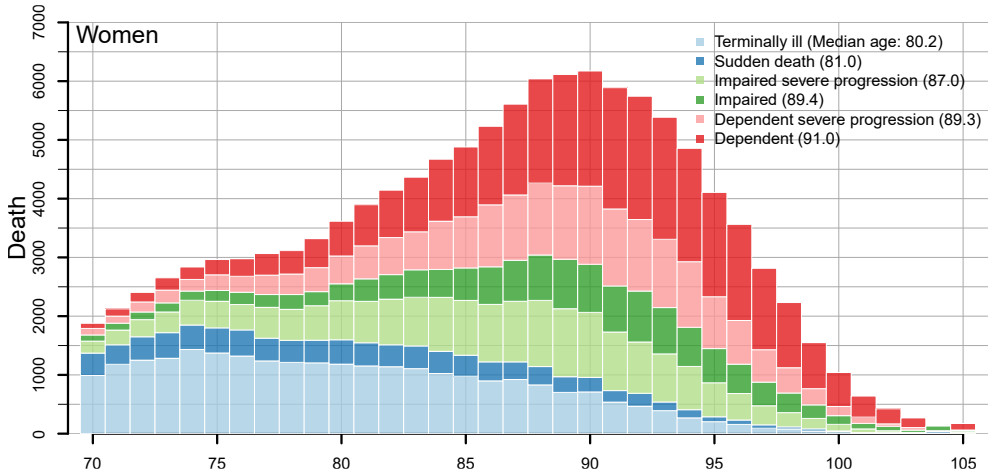

Figure 1 Death Counts by Age and End-of-Life Trajectory Type for People Aged 70 Years and Older, Women, Sweden, 2018–2020

Figure 1 shows the distribution of types of pathways to death over age that we derived in the previous study. A key finding from the figure is that pathways to death characterized by high care needs (dependent, dependent - severe progression, impaired, impaired - severe progression) become more common with age, and thus the likelihood of dying on one of these pathways also increases with age. We consider these pathways to be indicative of a slower progression to death, because all of them already show an increased need for care at the beginning of the last year of life, which suggests a slower progression to death. Consequently, the results invite the hypothesis that the increase in longevity is partly due to a slowing down of the dying process.

However, the increase in longevity differs between socioeconomic groups.[3,4] This may also suggests that pathways to death differ across socioeconomic groups. For example, one could expect that the care-intensive pathways at older ages are more prevalent in subgroups with a higher chance of surviving up these ages, such as those with higher income or education.[4–8] At present, however, we not only lack knowledge about pathways to death in general, but we also lack a comprehensive understanding of how they differ across socioeconomic groups.

Based on a linkage of several Swedish population registers, this study will address this knowledge gap and analyze socioeconomic differences in pathways to death for all deaths in Sweden above

the age of 60 during the years 2018 to 2022. Deaths over the age of 60 comprise around 90% of all deaths in Sweden each year, and thus, our analysis covers most of the spectrum of pathways to death.

Methods

Data

The study is based on all individuals aged 60 years or older at the time point of death that have died between the years 2018 to 2022. Trajectories are based on the five years prior death. We thus consider only individuals that have been registered in Sweden for the five years prior to their death. Information on date of birth, date of death, diagnosed diseases, prescribed medications and the amount of elderly care as well as socioeconomic characteristics are derived from a linkage of several Swedish registers. We use disposable household-adjusted income as measure for socioeconomic status.

Analytical strategy

As a first step, and to gain initial insights, we used the results (shown in Figure 1) from a previous study that classified deaths into six different types of pathways to death.[9] The types of pathways are calculated using latent class analysis, using six different indicator variables on elderly and medical care needs in the last year of life (elderly care status (no care, receiving home care and living in a nursing home) one year before (I) and at death (II), and during the last year of life, demand for inpatient care (III), demand for outpatient care (IV), demand for acute care (V) and demand for clinical care (VI)). These results include only deaths aged 70 and over between 2018 and 2020. Based on this classification and to get first results for this abstract, we examined socioeconomic differences in the distribution of pathway types by income quintile.

In a second step, and as the core analysis of this study, we will apply structural equation models to identify the latent trajectory types based on monthly information on health status (frailty score and multimorbidity scores), number of prescribed medications, monthly hours of care, days spent in hospital, and other indicators. Socioeconomic differences will be assessed in a subsequent step.

Preliminary Results based on previously derived types of pathways to death

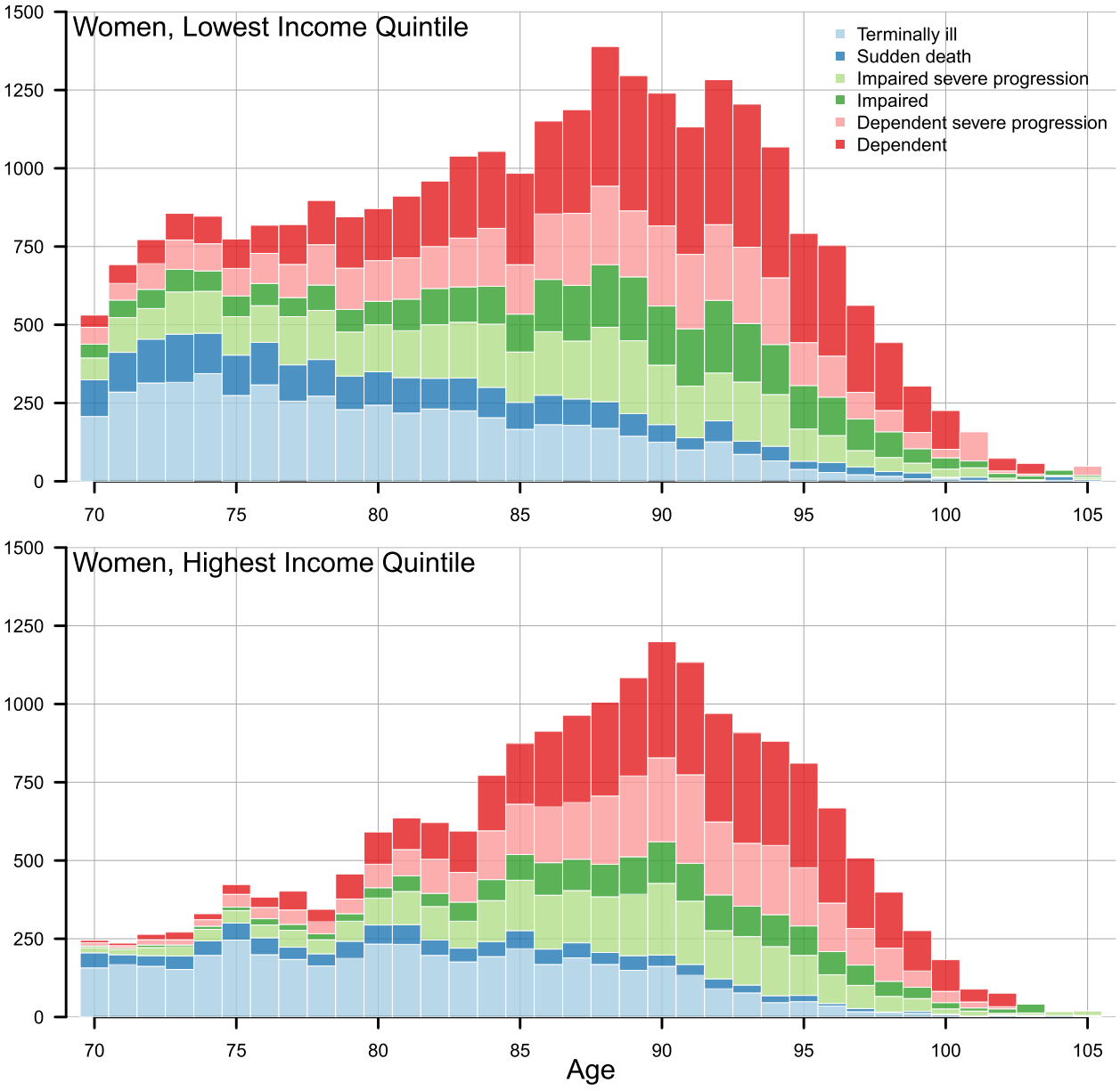

Figure 2 Death Counts by Age and End-of-Life Trajectory Type for Women Aged 70 Years and Older in the Highest and Lowest Income Quintile, Sweden, 2018–2020

Figure 2 shows the distribution of pathways to death for women in the highest and lowest income quintiles. The two distributions show marked differences by age. The higher number of deaths following care intensive pathways at younger ages for women in the lowest income quintile is particularly striking. However, this difference is primarily due to differences in the timing of death

rather than differences in the distribution of pathway types within income quintiles. This can be seen in Figure 3, which shows the number of deaths by type of pathway and income quintile.

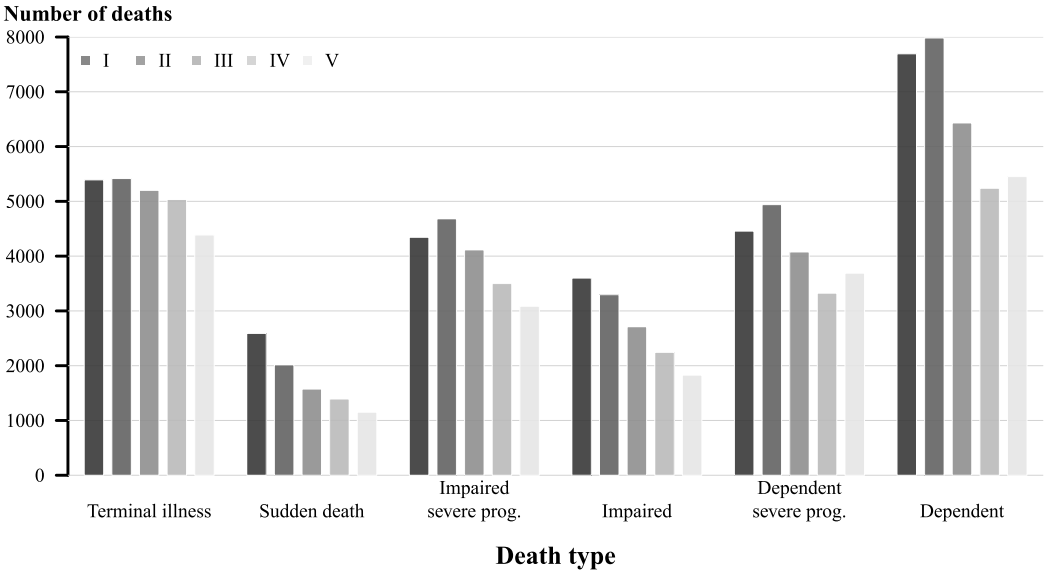

Figure 3 Death Counts by Income Quintile and End-of-Life Trajectory Type for Women Aged 70 Years and Older, Sweden, 2018–2020

Figures 4 to 6 are already based on the newly acquired data and cover the last five years of life. The figures show the median of the monthly hours of elderly care, a Frailty Score[10] and the number of days spent in hospital on a monthly basis for the lowest, middle and highest income quintiles. Both the Frailty Score and the number of days spent in hospital increase with income quintile and proximity to death. In contrast to this indication of poorer health at the time of death in the highest income group, the monthly number of elderly care hours increases earlier for people in the lower income quintiles. Taken together, these results suggest that the mortality advantage of high socioeconomic groups may be partly due to an even slower dying process compared to lower socioeconomic groups.

In the next step, we will use the variables presented in Figures 4 to 6 and other indicators to derive trajectory types. Structural equation models will allow us to analyze all of them in concert

and derive latent trajectory types that go beyond the last year of life. Based on these types, we will assess the socioeconomic differences.

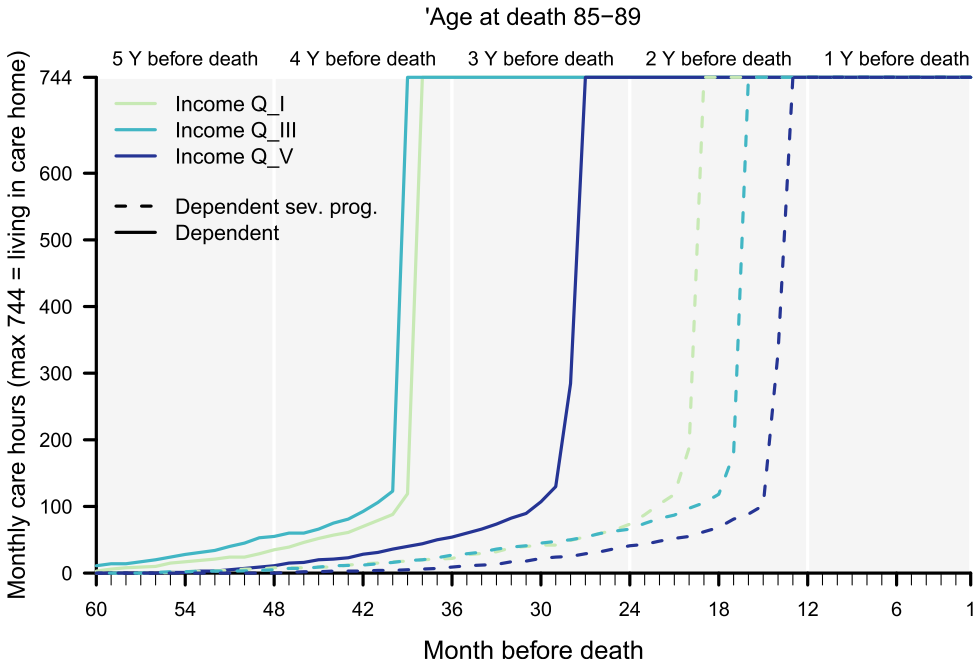

Figure 4 Median of Monthly Elder Care Hours for the Dependent and the Dependent Severe Progression Pathway Types for Death at Ages 85-89 in the Lowest, Middle and Highest Income Quintiles, Women, Sweden 2018-2020

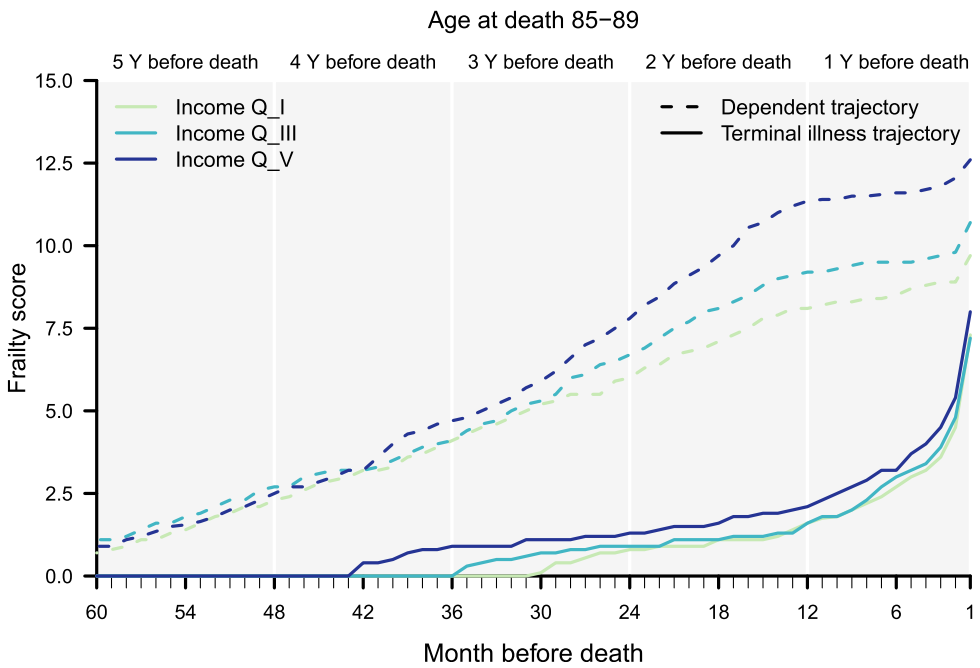

Figure 5 Median of the Hospital Frailty Risk Score for the Dependent and the Terminal Ill Pathway Types for Death at Ages 85-89 in the Lowest, Middle and Highest Income Quintiles, Women, Sweden 2018-2020

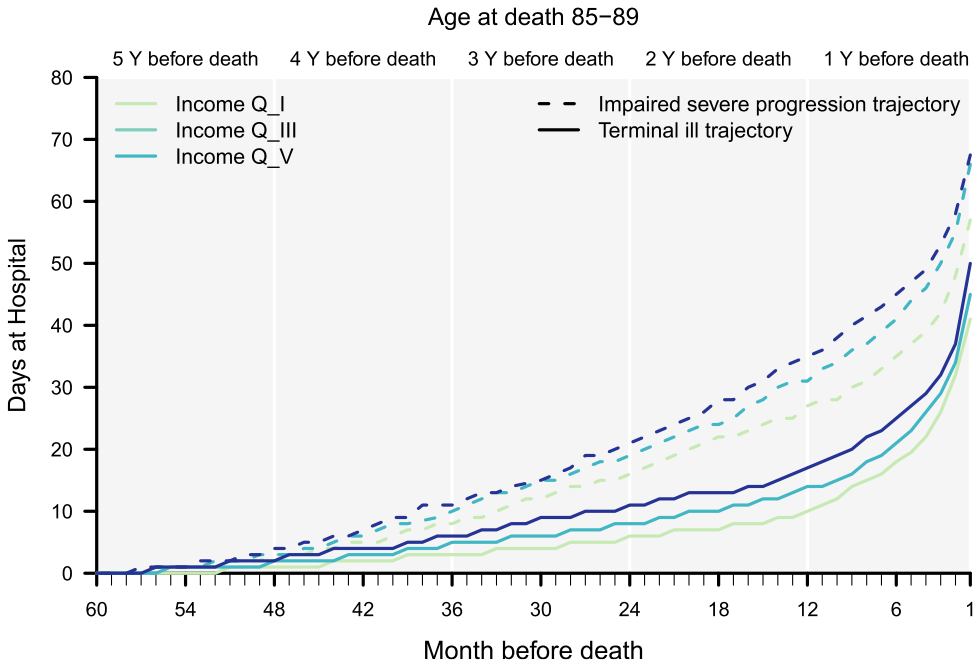

Figure 6 Median of the Days Spent in Hospital for the Impaired Severe Progression and the Terminal Ill Pathway Types for Death at Ages 85-89 in the Lowest, Middle and Highest Income Quintiles, Women, Sweden 2018-2020

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