Surnames and survival: Mortality differences across the life-course in Sweden

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Contribution and aims

We study socio-cultural inequalities in mortality using surname types that reflect socio-cultural *origins*, and distinguish:

1. Pre-industrial origins: nobility; latinized; French-/Greek-sounding; nature-oriented; soldier; patronymic; other.
2. Ethnic/linguistic origins: Sámi; Tornedalian/Meänkieli; Finnish-origin.

This surname-based approach, we argue, contributes in three ways: Firstly, substantively, as these groupings tap into potential mechanisms behind inequalities in death differently than occupation-based social classes. Secondly, empirically, they allow for a full-population analysis from a single source with no linkage loss. And thirdly, this enables us to also study infant mortality, an quantitatively important but – due to data limitations – understudied mortality. We answer the following research questions: Are there any mortality gaps between surname types? Do patterns differ by sex and cohort? And across the life course (childhood, mid-life, later life)? How much of surname inequality in mortality is associated with geography?

Theory and previous research

The socioeconomic gradient in mortality and health is widespread across societies today – existing regardless of societies' level of public provision of healthcare (Mackenbach 2019). Social determinants are suggested to shape higher life expectancy among higher socioeconomic groups (e.g., Marmot et al. 2008), with socioeconomic status being seen as a fundamental cause of health disparities (Link and Phelan, 1995). While a large socioeconomic gradient may have also existed for childhood mortality historically (Bengtsson and Lindström 2000, Dribe and Karlsson 2022; Jaadla et al. 2020), previous research suggests that such a gradient in (male) adult mortality was non-existent or even reversed; the SES gradients emerged in the twentieth century alongside changing disease regimes and behaviors (Bengtsson and van Poppel 2011; Debiasi and Dribe 2020; Bengtsson, Dribe and Helgertz 2020). This puts into question typical structural explanations of the health disadvantage of lower socioeconomic groups.

Spatial context (urbanisation, sanitation, environment) often out-predicted class in earlier periods, for example in Northern Sweden (e.g., Edvinsson and Broström 2012; Edvinsson and Lindkvist 2011). Urbanisation, sanitation, and contagion shape the geography of mortality also elsewhere (Haines 2004; Helgertz and Önnerfors 2019). Religion, language, or ethnicity also structure mortality (e.g., Sámi vs settlers, Sköld et al. 2011; Swedish- vs Finnish-speakers, Sipilä and Martikainen 2009; Mormon/Utah, Merrill 2004; Jewish neighborhoods in Amsterdam, Riswick, Muurling and Buzasi 2022). Further, lifestyle factors, and particularly infant feeding practices, mattered: maternal breastfeeding had a protective effect (observed in Sweden in Tornedalen: Brändström, Broström and Persson 1984; and more widely: Brändström, Edvinsson and Rogers 2002). A long-standing but unsettled debate relates early-life disease exposure to later-life health; the former may feed into the latter via selection and/or

scarring, with opposite expectations on socioeconomic characteristics of survivors (e.g., Bozzoli et al. 2009; Almond et al. 2018).

Data

We use the Swedish Death Index (SDI, v7), covering deaths in Sweden 1860–2017 and individuals' surnames. Two cohorts are analyzed: 1906–1910 (followed from birth to death) and 1866–1870 (followed from age 40 onward; adult mortality). Surname standardization and classification follow Dalman (2022) for the pre-industrial period; lists of ethnic names are newly developed and have been corroborated with onomastic experts. Neither aims to be exhaustive. Surname types reflect family origins as present in the linguistic properties of names.

Data quality and validation

Emigration from Sweden was high before 1910; we minimize potential bias due to this by cohort choice and by focusing on adult ages for the older cohort. We compare population counts to the 1910 census and official statistics to estimate residual bias. Age-specific hazards line up well with aggregate official statistics (Human Mortality Database). We capture ≈97% of the full population compared to the 1910 census and official statistics from Statistics Sweden, with similar surname-type distributions across sources (2–2.5% women, 3.5–4% men missing). We interpret this as the SDI having good coverage for full-population life-table construction by surname type post-1910, and at adult ages for an earlier cohort (born 1866–70).

Methods

We build complete cohort life tables by surname type, sex, and region, presenting l_x (cumulative survival up to age x), q_x (age-specific hazard rate), and e_x (life expectancy). To smooth hazards, we use moving windows centered around x, and $\sqrt[n]{{}_nq_x}$, with n=5 for larger surname groups, n=9 for smaller – with exact metrics at ages 0 and 95+ and iteratively increasing windows. We further compute hazard rate ratios by surname type vs. the full population to summarize relative differences across age ranges, abstracting from the general U-shaped mortality pattern over the life course: ${}_nq_{x,surname} / {}_nq_{x,full}$. For geography, we compare national surname gaps with Norrbotten and Västerbotten with the rest of Sweden (excluding Norrbotten and Västerbotten).

Results

We find substantial surname-group inequalities in mortality: a clear gradient between elite name groups and others, and substantial gaps between majority/minority names. This gradient is positive, in the sense that mortality is higher among those with common names than those with elite names. We also find higher mortality among those with minority than majority names – for both cohorts, and both men and women. The pre-industrial status gradient differs by gender; while we find a consistent gradient over time for women, among men, the adulthood gradient is reversed (i.e., higher mortality among elites) for the 1866–1870 cohort, but not for the 1906–1910 cohort. In terms of differences over the life-course, group differences are large in infancy, childhood, and early adulthood, and small in older age, in the 1906-1910 cohort. We do not distinguish here between age and period effects. Geography matters for ethnic-surname gaps, but a sizeable gap in life expectancy at birth, of about six years, exists also within Norrbotten.

Conclusion and Discussion

Surnames offer a population-wide marker of socio-cultural origins that complements class-based approaches and avoids linkage loss, enabling analyses of mortality inequalities across long historical periods. We document sizeable, patterned inequalities by surname type across the life course and between cohorts, notably between elite vs non-elite and majority vs minority origins.

Surnames highlight ethnic/linguistic and pre-industrial origins, relating to social class and socio-cultural distinction more broadly, that standard occupation-based class schemes miss: the distinction between minority/majority origins – with farming dominating but not dominated by those with minority names, and elite/common origins – with white-collar work dominating but not dominated by those with elite names, is often invisible in occupational classes. Mortality inequalities between these groups become visible when using surname origins, adding new layers to our comprehension of social inequalities in health. Results for pre-industrial status surnames are consistent with earlier studies finding positive SES gradients, and a reversed adult SES gradient among men historically (e.g., Bengtsson, Dribe and Helgertz 2020). Results for names reflecting minority origins suggest persistent health disadvantages, not fully explained by geography. This suggests that pre-industrial names reflect similar developments in mortality inequality as socio-economic (occupational class) differences, while minority names tap into different mechanisms behind mortality inequalities.

Mechanisms covered in previous research, which are potentially better reflected by either occupational classes, or surname types, include: material resources (nutrition, housing, crowding); lifestyle (care incl. breastfeeding, smoking, alcohol); social (care incl. breastfeeding, knowledge diffusion via peers, psychosocial stress); geographical (climate; infrastructure—urbanicity, sanitation, healthcare access); and institutional (knowledge diffusion—education, sanitation, healthcare access) factors. Beyond geography, an important role of institutional factors, or lifestyle and social factors (e.g., breastfeeding), are consistent with the observed persistent gradient in mortality between majority/minority names, contrasting with the reversed gradient for adult male mortality by occupational status. The gradient between elite and common names reflects a certain part of the socioeconomic distribution, where explanations such as differences in nutrition are less plausible. Relevant next steps would be to explicitly model mechanisms and causes of death underlying these contrasting gradients.

References

- Almond, Douglas, Janet Currie, and Valentina Duque. 2018. "Childhood Circumstances and Adult Outcomes: Act II." *Journal of Economic Literature* 56(4): 1360–1446.
- Bengtsson, Tommy, and Martin Lindström. 2000. “Childhood misery and disease in later life: The effects on mortality in old age of hazards experienced in early life, southern Sweden, 1760–1894.” *Population Studies* 54(3):263–277.
- Bengtsson, Tommy, and Frans van Poppel. 2011. “Socioeconomic inequalities in death from past to present: An introduction.” *Explorations in Economic History* 48(3):343–356.
- Bengtsson, Tommy, Martin Dribe, and Jonas Helgertz. 2020. “When did the health gradient emerge? Social class and adult mortality in southern Sweden, 1813–2015.” *Demography* 57(5):1945–1973.
- Bozzoli, Carlos, Angus Deaton and Climent Quintana-Domeque. 2009. “Adult height and childhood disease.” *Demography* 46(4), 647–669.
- Brändström, Anders, Göran Broström and Lars-Åke Persson. 1984. “The impact of feeding patterns on infant mortality in a nineteenth-century Swedish parish.” *Journal of Tropical Pediatrics* 30(3):154–159.

- Brändström, Anders, Sören Edvinsson, and John Rogers. 2002. "Illegitimacy, infant feeding practices and infant survival in Sweden, 1750–1950: A regional analysis." *Hygiea Internationalis* 3(1):13–52.
- Dalman, Elien, 2022. *Patterns of Persistence: Intergenerational mobility and Sweden's social structure 1865-2015*. Lund University (PhD Dissertation).
- Debiasi, Enrico, and Martin Dribe. 2020. "SES inequalities in cause-specific adult mortality: A study of the long-term trends using longitudinal individual data for Sweden (1813–2014)." *European Journal of Epidemiology* 35(11):1043–1056.
- Dribe, Martin, and Omar Karlsson. 2022. "Inequality in early life: Social class differences in childhood mortality in southern Sweden, 1815–1967." *Economic History Review* 75(2):475–502.
- Edvinsson, Sören, and Göran Broström. 2012. "Old age, health and social inequality: Exploring the social patterns of mortality in 19th-century northern Sweden." *Demographic Research* 26(23):633–660.
- Edvinsson, Sören, and Jonas Lindkvist. 2011. "Wealth and health in 19th-century Sweden: A study of social differences in adult mortality in the Sundsvall region." *Explorations in Economic History* 48(3):376–388.
- Haines, Michael R. 2004. "Growing incomes, shrinking people—can economic development be hazardous to your health?: historical evidence for the United States, England, and the Netherlands in the nineteenth century." *Social Science History 28*(2):249-270.
- Helgertz, Jonas, and Martin Önnerfors. 2019. "Public water and sewerage investments and the urban mortality decline in Sweden, 1875–1930." *The History of the Family* 24(2):307–338.
- HMD. Human Mortality Database. Max Planck Institute for Demographic Research (Germany), University of California, Berkeley (USA), and French Institute for Demographic Studies (France). Available at www.mortality.org (data downloaded on 2025-08-25).
- Jaadla, Hannaliis, Ellen Potter, Sebastian Keibek, and Romola Davenport. 2020. "Infant and child mortality by socio-economic status in early nineteenth-century England." *Economic History Review* 73(4):991–1022.
- Link, Bruce G., and Jo C. Phelan. 1995. "Social conditions as fundamental causes of disease." *Journal of Health and Social Behavior* 35(Extra Issue):80–94.
- Mackenbach, Johan P. 2019. *Health Inequalities: Persistence and Change in European Welfare States*. Oxford: Oxford University Press.
- Marmot, Michael, Sharon Friel, Ruth Bell, Tanja A. J. Houweling, and Sebastian Taylor. 2008. "Closing the gap in a generation: Health equity through action on the social determinants of health." *The Lancet* 372(9650):1661–1669.
- Merrill, Ray M. 2004. "Life expectancy among LDS and non-LDS in Utah." *Demographic Research* 10(3):61–82.
- Riswick, Tim, Sanne Muurling, and Katalin Buzasi. 2022. "Exploring the mortality advantage of Jewish neighbourhoods in mid-19th century Amsterdam." *Demographic Research* 46(25):723–736.
- Sipilä, Petteri, and Pekka Martikainen. 2009. "Language-group mortality differentials in Finland in 1988–2004: assessment of the contribution of cause of death, sex and age." *European Journal of Public Health* 19(5):492–498.
- Sköld, Peter, Lena Karlsson, Per Axelsson, and Len Smith. 2011. "Infant mortality of Sami and settlers in Northern Sweden: The era of colonization 1750–1900." *Global Health Action* 4:8441.