

Summary

Socioeconomic inequalities in health remain one of the most pressing public health challenges of our time. Despite remarkable advances in cancer prevention, diagnosis, and treatment, these improvements have not benefited all population groups equally. As cancer has become one of the leading causes of morbidity and mortality worldwide, understanding and reducing socioeconomic inequalities in cancer has become increasingly important.

Against this background, the overarching objective of this PhD dissertation was to disentangle socioeconomic inequalities across the cancer continuum, encompassing cancer incidence, post-diagnosis survival, and mortality. Throughout the dissertation, educational attainment was used as the primary indicator of socioeconomic position (SEP), as it remains a robust, stable measure that reflects both health literacy and resources across the life course. By examining these outcomes across different time periods, age groups, cancer sites and national contexts, this dissertation sought to provide a comprehensive understanding of where socioeconomic inequalities in cancer mortality arise.

To address this objective, the dissertation is organised around four complementary empirical studies. It begins by documenting long-term trends in educational inequalities in cancer mortality in Belgium, examining how these inequalities evolved across time, age groups, and cancer sites (Chapter 2). It subsequently investigates the mechanisms underlying these mortality inequalities by disentangling the relative contributions of cancer incidence and post-diagnosis survival, first within the Belgian population and then through a comparison with Finland (Chapters 3 and 4). Finally, it adopts an in-depth focus on breast cancer to examine the contribution of reproductive factors and stage at diagnosis to socioeconomic inequalities in cancer incidence, post-diagnosis survival, and mortality (Chapter 5).

Taken together, the empirical findings reveal that socioeconomic inequalities in cancer are deeply context-dependent and driven by distinct underlying mechanisms. Long-term trends demonstrate a strong temporal and cohort dimension (Chapter 2): over time, inequalities in mortality initially widened as new preventive and curative advances were first adopted by highly educated groups, acting as 'early adopters'.

Applying an incidence–survival decomposition framework demonstrates that mortality statistics alone mask crucial underlying dynamics (Chapters 3 and 4). Across both Belgium and Finland, lung cancer stands out by being almost entirely incidence-driven: mortality disparities are consistently and overwhelmingly driven by massive differences in cancer incidence (Chapters 3 and 4). Conversely, for cancers such as female breast cancer and melanoma, we observed striking opposing pathways (Chapters 3-5): while incidence was substantially higher among highly educated individuals, this disadvantage was offset by their

significantly better post-diagnosis survival chances. Focusing on breast cancer, Chapter 5 further demonstrates that these survival advantages are partially explained by earlier stage at diagnosis among higher-educated women, whereas incidence disparities are linked to their reproductive profiles (parity and age at first childbirth).

Overall, this dissertation advances the epidemiological understanding of cancer inequalities by moving beyond a description of mortality gaps toward identifying the specific pathways that generate them. These findings have direct implications for public health. Rather than relying on generic, 'one-size-fits-all' strategies, interventions must be tailored to the specific mechanisms driving disparities. Crucially, reducing socioeconomic inequalities in cancer requires a primary focus on upstream policies that address structural social determinants. At the same time, downstream healthcare interventions should be more targeted to specific, vulnerable groups in society.