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Introduction to the special issue collection, How and why are health inequalities changing over time?

1. Introduction

Health inequalities across social and economic conditions are one of the most unjust phenomena produced by human society yet remain durable and pervasive on local and global scales. Empirical studies that have quantified the extent and nature of health inequalities have been vital in supporting political and policy efforts to alleviate health inequalities and improve population health. For instance, the finding that income and education influence people's health was once novel, but is now considered commonsensical and integral to the ubiquitous social determinants of health framework (Marmot et al., 2008). However, over the past few decades, inequalities in these social determinants have intensified in many places around the world, calling into question whether these changing trends have also altered trends in health inequalities.

While some literature has evaluated health inequalities over time, the link between changing socioeconomic conditions and trends in health inequalities is relatively underdeveloped in population health. Examples of this literature include work by Chetty and colleagues (2016) who used U.S. tax-filing records linked to mortality files to demonstrate that, from 2001 to 2014, the gap in income-based inequalities in life expectancy had widened. As the richest quartile of Americans gained three years of life expectancy over that 13-year period, the poorest quartile's life expectancy remained stagnant. Similarly, Hajizadeh et al. (2016) found that income-related health inequalities widened in Canada from the 1990s–2010s. Far less work has been done however in contexts outside of North America and Europe, and on changing health inequalities by other dimensions such as race/ethnicity, gender, and their intersections. Most studies on changing inequalities have also focused on mortality, while trends in other health outcomes are less explored. Without knowing how inequalities, in a range of outcomes and across various dimensions, have changed over time, it is difficult to grasp a full picture of what has led to improvements or declines in population health.

As such, motivated by this need, we have assembled a special issue to address the question: *how and why are health inequalities changing over time?* The inclusion criteria were broad as we considered any study so long as it evaluated health inequalities across structural drivers in a dynamic manner. The call for papers also encouraged articles from areas outside the Global North. With this introduction to the special issue, we present the 16 included papers and what they have captured regarding trends in health inequalities around the world.

2. Contributions to the special issue

The articles in this special issue examine these questions from a strikingly varied array of contexts, data, outcomes, and methodological approaches. Most articles performed empirical analysis on changes in the trends of health inequalities over time, and most often by measures of socioeconomic status like income. As well, the most common outcomes included mortality, self-rated health, and mental health. Data from over 20 countries are represented, including those outside of the Global North such as South Africa, Senegal, China, South Korea, Peru, Colombia, and Mexico.

The diversity of findings in this issue suggests that the reality of how health inequalities are changing is far from straightforward. Inequalities have shrunk, grown, or remained unchanged, depending on the outcomes and country contexts in question. In what follows, we provide a synthesis of the papers that appear in this issue. The papers fall roughly into categories that are organized by outcome or theme: I) inequalities in healthy aging; II) trends in structural health inequalities in understudied contexts; III) socioeconomic inequalities in mortality trends; IV) changes in health inequalities across other social dimensions; V) spatio-temporal dynamics of health inequalities; and VI) Inequalities in health-related structural conditions. All in all, the papers of this special issue serve as a reminder of how complex health inequalities are, and the need to interrogate the reasons behind empirical trends. The contributions to this special issue also reiterate the need to advance our methods toolkit as researchers of health inequalities, as well as the need to push our conceptual and theoretical thinking about health inequalities.

2.1. *Inequalities in healthy aging*

An expanding area of research has been inequalities among older adults or in the aging process. Wilkie et al. (2024) provide a comprehensive analysis of the changes in inequalities in functional limitations

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(e.g., difficulties with physical tasks like walking or lifting objects) over time by education status, for older adults in 14 high- (USA and Europe) and middle-income (China and Mexico) countries. For many high-income countries, the overall level of functional limitations and amount of inequality decreased or improved during the study period, such as in Spain and Sweden. In contrast, the countries for which overall levels of functional limitations increased statistically significantly were also those for which inequalities grew, like China, Mexico, and Germany. The United States possessed the largest educational inequalities in functional limitations and continued to over the study period from 2003 to 2006 to 2017–2019 (Wilkie et al., 2024). As a descriptive study, the authors do not test potential mechanisms to explain the varied cross-national trends but speculate that systemic differences in improvements to social conditions have likely led to these changing within- and between-country health inequalities among older adults.

Salinas-Rodríguez et al. (2024) elaborate on the case of health inequalities among older adults in Mexico specifically, using one of the same datasets as in Wilkie et al. (2024), the Mexican Health and Aging Study. However, Salinas-Rodríguez et al. (2024) examine a range of different outcomes and across dimensions like wealth and gender, instead of education. They find that overall prevalence and inequalities in many conditions have widened over time, like mild cognitive impairment and frailty, especially between men and women. Wealth, specifically, appears to matter the most, as wealth inequalities in these health outcomes seem to be the largest and the most consistent or unchanging over time. Together, it is apparent that health inequalities based on socioeconomic status continue into older age, with many newer cohorts experiencing worse health at the same age than as previous cohorts (with some exceptions presented in Wilkie et al., 2024). Inequalities in the process of healthy ageing is and will be a critical challenge for social and health policy, as equitable health and social care programs have not been prioritized despite growing numbers of older-age individuals.

2.2. Trends in structural health inequalities in understudied contexts

In our call for papers, we emphasized the need for research in contexts often overlooked in questions of health inequalities, such as those outside of North America and Europe. The necessity for this research is articulated by Abdalla and Galea's (2024) commentary in this issue, where they propose a refocusing of global health scholarship to emphasize the macrosocial drivers of health. Despite the shift in burden from communicable to non-communicable diseases in many low- or middle-income (LMICs), much of the research—and funding—remain focused on the former, and through a biomedical lens. As such, inequalities in health by structural conditions like socioeconomic status are lacking in contexts outside of western, high-income, democratic and industrialized countries. Furthermore, Abdalla and Galea (2024) discuss the importance of assessing between-country health inequalities. This necessitates supporting research on health inequalities done outside of North America and Europe, which Abdalla and Galea (2024) propose, and we try to do in the issue. While this section specifically discusses socioeconomic-based health inequalities, from countries like South Africa and China, several other papers throughout the issue in subsequent sections also come from authors outside of western, high-income democratic societies.

Two studies utilize decomposition analysis—an econometric method relatively nascent in epidemiology that quantifies the contribution of group differences in characteristics to group differences in outcomes—and provide clues as to *why* health inequalities may be changing. One study by Ataguba (2025) evaluates changes in socioeconomic inequalities in self-rated health in South Africa and finds that they have reduced from 2008 to 2017. The study's findings suggest that this decline in health inequalities is attributable to a decline in socioeconomic inequalities over the study period. Moon and colleagues (2024) perform a similar analysis on inequalities in self-rated health, though in South Korea, and with additional insight into gender differences in trends. Unlike Ataguba (2025) however, the authors find that health inequalities have remained largely unchanged in South Korea, despite the overall decline in the prevalence of poor self-rated health during the study period of 1998 to 2016–2018. In addition, poor health was consistently concentrated among women, and thus, lower-income women especially. Inequalities in educational level and income quartile contributed the most to health inequalities among men and women, and their contribution remain largely unchanged over the study period. Hence, it is apparent that reductions in socioeconomic inequalities can have a beneficial effect in reducing health inequalities, as shown in Ataguba (2025), while maintaining the status quo produces no such benefit (Moon et al., 2024).

In a different context, Bjerregaard et al. (2024) analyze changes in health inequalities among Inuit in Greenland and produce varied findings, depending on the outcome. The authors find that inequalities in smoking grew consistently from 1993 to 2018, by each measure of social position examined (i.e., household assets, urbanization, and sociocultural index). In contrast, changes in inequalities in suicidal thoughts possessed a less clear pattern, and inequalities in obesity declined over time by social position. They hypothesize that rising economic inequality may be behind rising health inequalities, but do not formally test for this. Still, examining different outcomes is beneficial in supporting the evidence base for policy solutions that can target specific health issues (e.g., legislation to facilitate smoking cessation).

Taking a different approach to the analysis of health inequalities over time than other studies in this issue, Zhang and Veenstra (2024) examine whether the passing down or "reproduction" or socioeconomic standing from parents to children is implicated in socioeconomic inequalities in mental health in China. They find indeed that socioeconomic standing is reproduced intergenerationally; however, parental resources were more strongly associated with people's mental health for the younger cohort (aged 23–44) while people's own socioeconomic status mattered more for the older cohort (aged 45–65). As such, health inequalities among the newer generation are based more on parental standing, which may indicate an increasing importance of intergenerational status differences in China. Hence, health inequalities may widen based on growing inequalities in intergenerational social mobility. Given that social mobility is a critical policy challenge across the globe, redistribution of material resources and expansion of opportunities for socioeconomic advancement remain important structural solutions for health inequalities.

2.3. Socioeconomic inequalities in mortality trends

Several studies look at mortality inequalities, across different countries. This section reinforces the fundamental role of material deprivation in determining mortality and poor health, and their inequalities, though specific mechanisms are not tested. For instance, a study by Rojas-Botero et al. (2025) looks at trends in avoidable under-5 mortality in Colombia and is the only one in the issue to focus on children's outcomes. The authors find that while avoidable under-5 mortality declined significantly over the 20-year study period, inequalities persisted between the departments or regions with higher versus lower levels of deprivation indicators (e.g., unmet basic needs, percent of illiterate women, poverty index). Hence, that efforts to improve health outcomes nationwide have only benefited those in regions of lower deprivation, suggests that territorial health inequalities widen if underlying structural inequalities are not addressed.

Another paper in the special issue on mortality by Rosella and Buajitti (2024) examine the income-based gradient in both premature mortality and its risk factors, including smoking, alcohol consumption, overweight BMI, and low physical activity. With a sample of Canadians from 2005 to 2014, the authors find an income gradient within every risk factor for premature mortality, such that even within the highest risk factor group, higher-income individuals still possess higher survival rates than those lower-income. As such, while public health programs

and legislation have historically centered on improving health behaviours to improve health, the study's findings underscore the need to prioritize alleviating social inequalities.

2.4. Changes in health inequalities across other social dimensions

While most studies in this special issue focus on health inequalities by measures of socioeconomic status, a few analyze inequalities across other social dimensions. Together, they expand our understanding of the multidimensional nature of health inequalities and demonstrate the importance of evaluating the macrosocial and historical context that produces inequalities with and without considering intersectionality.

One study by Shaikh (2024) compares mortality rates in coal mining versus non-coal mining areas in England and Wales, after the closure of the industry in the 1980s and 1990s. Using a matching design, the author finds a convergence or reduction in inequalities in mortality between coal mining and non-coal mining areas from 1981 to 2019 by around 70% for women and 90% for men. Former coal mining areas still present poorer health outcomes compared to non-coal mining areas today however, which calls for further temporal evaluation into the additional consequences the industry has left on health.

Another paper by Fowle and colleagues (2024) provides an alternative conceptualization of racial health inequalities and shows how common theories of determinants of health can have certain contextual limitations. The authors examine whether the persistent Black-white racial disparity in mortality in the United States is inverted for people experiencing homeless. The authors hypothesize that this is due to racial differences in the selection process into homelessness; Black individuals are more susceptible to homelessness due to structural racism that increases their housing precarity, whereas white individuals' relative economic privilege makes it such that they must be particularly vulnerable (health-wise especially) to enter homelessness. They test their theory of "racial mortality inversion" on a novel dataset of 18,000 homeless individuals who died from 2015 to 2020 and find that the overall mortality rate for the white homeless population was around double the rate for their Black counterparts. The evidence for their theory demonstrates the urgency to reduce racial inequalities in housing precarity and establish protections for people experiencing homelessness.

Lastly, Salway et al. (2024) examine trends in mental health and smoking disparities by sexual orientation in Canada from 2003 to 2020. They find that mental health worsened overall over this period, while the prevalence of smoking decreased, for both heterosexual and sexual minority groups. However, there was variation in these health trends; for instance, they note how poor mental health among bisexual women decreased initially from 2003 but increased drastically after 2009 and continued upward until the end of the study period. The authors do not assess examine why these inequalities have changed but speculate that backlash to protective legislation and the increased politicization of sexual orientation have likely worsened stress for sexual minority groups.

2.5. Spatio-temporal dynamics of health inequalities

Another important contribution to this special issue consists of two studies that examine the spatial and temporal dynamics of inequalities in health outcomes, namely mental health. Tsimpida et al. (2024) examine changes in depression prevalence over time in England and whether these changes are explained by area-level deprivation. They find that overall depression prevalence increased from 2011 to 2022, with inequalities expanding between areas with higher versus lower rates of increase. With their spatial analyses, they also find that areas with high depression prevalence and growth in trends were most concentrated in North England. Further research is needed to evaluate the mechanisms behind the relationship between local/neighbourhood-versus larger area-level deprivation and depression prevalence.

Villarreal-Zegarra et al. (2025) also present results from a spatial analysis, though to examine socioeconomic inequalities in access to treatment for depression in Peru. They find that inequality in healthcare access was larger and generally stagnant over time between the richest and poorest quintiles. At the same time however, depression prevalence decreased the most among the richest group from 2014 to 2021, leading to an increased gap in need versus access to depression-related healthcare. Regarding their spatial analysis, they find that depression hotspots largely remained as such over time. While the authors do not formally test why, they propose that longstanding structural issues related to the Peruvian healthcare system and insufficient government intervention have exacerbated barriers to treatment for the poorest groups.

The shifting geographic burden of mental health, as these two studies have shown, highlight the importance of evaluating the changing neighbourhood characteristics or larger political or economic contexts that shape health. Evidence of such geographic hotspots can be conducive to identifying targeted policy solutions and involving the relevant stakeholders to help alleviate such mental health inequalities.

2.6. Inequalities in health-related structural conditions

The two remaining papers in the special issue addresses changes in health inequalities by evaluating health-related infrastructure or contextual factors that play a role in determining health. For instance, Kiani et al. (2024) looks at cycling infrastructure as a determinant of health and wellbeing, given its benefits as a form of transportation and physical activity. The authors evaluate changes in cycling infrastructure from 2011 to 2016 in Montreal, Canada and determines whether these changes are associated with census-tract level material deprivation, percentage of visible minorities, and level of gentrification. They find that improved cycling infrastructure (e.g., length of protected bike lanes, cyclist-only paths) increased from 7 to 11 %, but mostly for census tracts with pre-existing infrastructure, and tracts with a lower proportion of visible minorities. As a result, cycling infrastructure has not become more equitable over time, and continues to remain comparatively inaccessible to neighbourhoods with more minoritized people in Montreal.

Examining health inequalities from a different angle, Samba and colleagues (2024) examines which socioeconomic groups benefit the most from public health expenditure in Senegal. Through a benefit incidence analysis of healthcare need versus utilization, they find that such expenditure has a regressive nature; despite heightened investment into Senegal's health sector, primary healthcare and hospital care are still mostly utilized by the richest groups. As such, the authors conclude that inequalities in healthcare utilization will persist if increases in public health expenditure are not accompanied by policies to improve the equitable distribution of health services. Their findings reiterate the importance of looking at outcomes over time, in evaluating whether the intended effects of policy or funding changes have been realized.

3. Discussion and conclusion

The diverse set of articles in this special issue present some answers, and additional branches of inquiry, to the question of how and why health inequalities are changing over time. Across a range of outcomes and contexts, while overall prevalence rates of poor health may be declining, inequalities appear to remain unchanged or even growing, with some exceptions. Socioeconomic inequalities remain a large driver of health inequalities, though dimensions like race/ethnicity, neighbourhood deprivation, and sexual orientation remain important axes by which health inequalities persist. The selected articles also reveal a range of conceptual and analytical approaches researchers can take to evaluating changes in health inequalities over time (and space), including the appropriate data sources and methods.

Most articles were descriptive in nature, which provided a breadth of

insight into *how* trends of health inequalities have changed. However, despite providing reasonable explanations for these trends, very few provided empirical evidence that could support *why* such trends have changed. While it has become common knowledge that socioeconomic status is an important indicator of health, there is some evidence from this Special Issue (e.g., Ataguba, 2025) that a *change* in socioeconomic inequalities may engender a *change* in health inequalities. There is ample opportunity for future research in this area as a result, and further work to evaluate whether changes in the trends in underlying social and structural determinants of health also contribute to changes in trends in health inequalities.

While the issue features papers across a wide range of topic areas and contexts, a few increasingly important themes were notably absent, which provide further areas of inquiry with respect to dynamic health inequalities. These include questions of climate-based or environmental health inequalities, inequalities in reproductive outcomes and rights, and the political drivers of health inequalities. As well, this issue includes only one multi-country empirical study, whereas a global or cross-national evaluation of changing health inequalities in important to understand the dynamic nature of health inequalities.

In putting together this special issue, our goal is to draw attention to the importance of interrogating the dynamic and multidimensional relationship between social conditions and health inequalities. The vastly unjust nature of such inequalities highlights the urgent need for immediate and effective policy action to eliminate the underlying drivers of poor health. While societies today face less illness and disease than they have centuries or even fifty years ago, the persistence of health inequalities conflicts with the moral judgement shared widely across the world that health is a human right.

CRediT authorship contribution statement

Victoria Tan: Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing. **Arjumand Siddiqi:** Conceptualization, Formal analysis, Investigation, Supervision, Writing – original draft, Writing – review & editing, Methodology. **Falan Bennett:** Conceptualization, Formal analysis, Investigation, Methodology, Writing – review & editing. **Mabel Carabali:** Conceptualization, Formal analysis, Investigation, Supervision, Writing – review & editing, Methodology.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

No data was used for the research described in the article.

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