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Pathways to Health

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Preface

Health is of fundamental importance for both national and individual well-being and ill health has major implications for individuals, their families and communities, employers, service providers and society as a whole. Extensive research has shown that socio-economic and demographic factors are associated with health outcomes and the importance of these associations for public policy is widely recognised, as shown by national and international commissions on the Social Determinants of Health. For the development and assessment of strategies to improve health, it is of crucial importance to understand which pathways link social and biological disadvantage, and whether such pathways act across generations as well as within a lifetime. Recent years have seen major advances in our understanding of some of these processes, including recognition of pre-natal, early life and other life course influences on adult diseases, as well as developments in the conceptualization of the possible pathways linking socio-economic, demographic and community contexts to health. There has also been substantial advances in methodology for the study of pathways—in particular for the formal identification of mediating factors—and for dealing with ubiquitous sources of systematic bias, such as missing data and measurement error.

This book has its origins on the National Centre for Research Methods node “Pathways” that was funded by the Economic and Social Research Council between 2011 and 2014. Pathways had a substantive as well as a closely linked methodological focus which is reflected in the chapters of the current volume. The substantive focus was on the investigation of pathways that link socio-demographic circumstances to health with an emphasis on the mediating factors that lie on these pathways, while the methodological focus was in the development and dissemination of rigorous approaches for the formal identification and quantification of these pathways. The integration of methodological approaches to simultaneously deal with challenges such as measurement error and missing data in applications where pathways or other life course processes are formally quantified is the core focus of this volume.

We believe that this integration will enhance the ability of the social science community to investigate specific hypotheses and potentially inform public health interventions, and also promote methodological exchange between the social and biomedical research communities. The dissemination and facilitation of such integrated methods among the social science community is timely, given the increasing availability of individual-level data on biological and social dimensions measured over time and the complexity of the mechanisms that link these dimensions over the life course.

The four chapters presented here capitalise on the richness of UK-based longitudinal surveys that allow the investigation of complex mechanisms and the rigorous quantification of pathways to health over the life course, while simultaneously dealing with biases due to missing data and measurement error. Rhian Daniel and Bianca De Stavola in Chap. 1 provide us with a thorough but accessible introduction to the latest developments in mediation analysis which is crucial for the appropriate estimation of pathways. The authors clarify the assumptions implicit in approaches such as Structural Equation Modelling and how these are relaxed within the counterfactual approach, highlighting particular issues such as intermediate confounding which is particularly pertinent in longitudinal and life course studies. In Chap. 2, Ploubidis, Benova, De Stavola & Grundy, combine Linear Structural Equation Modelling with the parametric G formula to investigate the life course patterning of socio-economic position induced differences in health related behaviour. By formally quantifying the pathways through which socio-economic position at various stages of the life course is hypothesized to influence health-related behaviour, the authors showed socio-economic gradients in smoking, physical activity and alcohol use, but to a lesser extent in healthy dietary habits. Read & Grundy in Chap. 3 employ latent change score modelling within a Linear Structural Equation Modelling framework to investigate the role of physical activity as a moderator and/or mediator of the association between fertility history and later life health. By formally quantifying the concepts of mediation and interaction, the authors show that physical activity serves as a mediator in the association between fertility history and the level of later life functioning, but that it also moderates the level of health disadvantages related to high number of children and parenthood. In the last chapter, Ploubidis & Pongiglione conceptualise pathways to health as life course trajectories and compare the evolution of self-rated health over the life course in two generations born 12 years apart in twentieth century Britain. They find that the evolution of self-rated health over time differed between the two cohorts, both with respect to the shape of change over time as well as the average level of reported self-rated health. They also document a worrying increase in self-reported bad health in the more recently born cohort, which given the expected increase in life expectancy, has major policy implications, given that the increase has occurred despite economic growth.

To round things off, I would like to thank the contributors of this book for their excellent and hard work. It was a great pleasure working with a multidisciplinary team during the three years of the Pathways project as well as the book. I would also like to thank the Centre for Longitudinal Studies and the Institute for Fiscal

Studies at University College London as well as their funders for making the longitudinal data used in this book freely available to all scientists worldwide via the UK Data Service.

London, UK

George B. Ploubidis

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Benedetta Pongiglione holds a Ph.D. in Epidemiology and Population Health from the London School of Hygiene and Tropical Medicine, University of London. She previously obtained a degree in Economic and Social Science from Bocconi University and completed the European Doctoral School of Demography program. She is currently involved on research on cost and outcome analysis of healthcare technologies and development of scientific models to investigate medical practice variations to foster the use of economic evaluation in policymaking. Benedetta's research interests include socio-structural inequalities in health, and understanding their causes and consequences.

Bianca De Stavola joined UCL GOS Institute of Child Health after 23 years at the London School of Hygiene and Tropical Medicine where she was Professor of Biostatistics in the Department of Medical Statistics and co-Director of the Centre for Statistical Methodology. Bianca's main research activities involve the understanding, development and implementation of statistical methods for long-term longitudinal studies, with specific applications to life-course epidemiology. As these often involve causal enquiries, in particular, related to understanding pathways towards disease development, mediation analysis is her main interest.

Rhian Daniel is a statistician with a particular focus on methods for learning about cause-effect relationships from observational data. She is especially interested in situations, such as when attempting to learn about the joint effects of sequential exposures in the presence of time-dependent confounding, or when attempting to