

Preface

Mounting scientific evidence generated over the past decade points to the significant role played by the myriad attributes of our cities' built environments in shaping our health and well-being. Nonetheless, the attainment of healthy cities still remains a massive unmet challenge to urban societies at all levels of development. The production and socio-spatial distribution of health originate as a result of a complex interplay between contextual socio-economic, built and natural environmental as well as individual- and population-level factors; and this complexity is tricky to unravel. We undertook to write this book with this challenge in mind. In particular, we wanted to bring together the disciplines of urban planning, public health and epidemiology and show how once again in the modern history of urban planning they have need of each other. The modern era of urban planning in the UK, and the West as a whole, started under the influence of public health studies and policy concerns. We believe that it is time to reunite the two fields in more than a rhetorical manner.

To decipher the impact of healthy (or unhealthy) places upon health outcomes, the book hypothesizes that the constituent components of the built environment, especially the configuration and design of land uses and street networks, govern the distribution of resources and services and configure neighbourhood activity space. They thereby influence individual physical activity behaviour, social interactions, general well-being and specific health such as weight outcomes and mental health. The underlying causal hypothesis in the book, and in the field of studies that it reviews and extends, is that the configuration of urban space and the distribution of opportunities within its subspaces influence physical activity and influence exposure to health-enhancing and -subtracting factors.

The transport networks of a city, particularly its road grid, can be thought of as distributing the benefits and costs of living together in a city. For this reason, property prices are highly correlated with the accessibility conferred by the grid. The urban grid also distributes health risks. If this is so, then it should be possible to use urban accessibility measured from the road network to both explain and predict individual health variations within cities.

Chapters 1–4 conceptualize the *urban health niche* as a novel holistic and spatially explicit paradigm in health-related urban planning and public health planning, and propose a method for empirically modelling the healthy city. Chapters 5–8 demonstrate how this paradigm, informed by accumulated research evidence, can be used to structure empirical studies and provide scientific evidence much needed to support healthy-city policy and planning. These empirical chapters show how we have created and integrated multi-level data sets pertaining to health, socio-economic, built and natural environments to constitute a high-resolution health niche database. We call this a *spatial Design Network Analysis for Urban Health* model (*sDNA-UH*) after the *sDNA* spatial network analysis tool that conceptually and empirically underlies the implemented health niche model (<http://www.cardiff.ac.uk/sdna/>). The *sDNA-UH* model reported in this book has been developed for the assembly constituency of Caerphilly, an assembly constituency of South Wales in the UK.

State-of-the-art spatial and network analysis performed on UK Ordnance Survey MasterMap data layers creates objective measurements of urban built environment accessibility (morphological metrics – *morphometrics*). These are used to investigate fine-scale associations between urban configuration and individual health. We employ health data from the Caerphilly Prospective Study, a long-standing and internationally prominent cohort study of adult men. Using the morphometrics and the health data, we construct a series of multi-level cross-sectional and longitudinal models in Chapters 5–8 to examine the association between built environment configuration and individual health outcomes.

The conceptual and empirical chapters (Chapters 1–4 and 5–8 respectively) are intended to point to a more focused and evidence-based approach to investigating and designing for healthy cities. We hope that the book will encourage a new generation of scholars to pursue the new opportunities now available through innovations in data and spatial and network data analysis methods and technology.

The book is intended to be of interest to an interdisciplinary body of scholars, practitioners and policy makers within the domains of urban planning, spatial epidemiology, health geography, sociology, public health and psychology. The empirical studies in Chapters 5–8 are especially intended for advanced undergraduate and postgraduate scholars and urban health researchers who may want to integrate readily accessible spatial data with health data in constructing robust spatial epidemiological and public health models.

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