Introduction
Improving Healthcare through Built Environment Infrastructure

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Healthcare service provision is increasingly becoming a complex and dynamic process affected by myriad causes that cut across socio-techno-economic boundaries. The fast pace of policy and structural changes across private and public organisations, combined with an accelerated change in technological innovations, has challenged traditional viewpoints and paradigms in how health and care services are conceived, designed, implemented and sustained in what has become a very expensive and resource-intensive environment. Innovation is no longer an optional extra but part of the essence of any changes suggested for now and the future – innovation needs to be normal practice.

There is a growing drive and determination from public sector bodies worldwide to improve the populations’ health, including their physical and mental well-being. There is also a clear recognition that the built environment in general and healthcare infrastructure in particular have a very important role to play in terms of supporting health and well-being, encouraging healthy lifestyles, improving quality of life and increasing efficiency and effectiveness. In the UK, healthcare challenges arise from issues like an ageing population that needs better, more personalised healthcare as well as more supportive environments to be enabled to live longer independently. This imposes new challenges for the built infrastructure. The impact of the physical environment on health and well-being is highlighted in many reports including a foresight programme that will advise the UK government on how to achieve the best possible mental development and well-being for everyone in the future (see http://www.foresight.gov.uk). Consequently, new healthcare initiatives focus on community settings, seeking conditions to provide integrated, personalised healthcare services closer to the communities and home, widely and sustainably supporting prevention and healthy living styles, and supporting the regeneration of urban areas. Indeed, the increasing awareness of the role of the built environment for health and well-being resulted in it being at the heart of many public sector initiatives across the UK.
Despite the growing interest in healthcare infrastructure, it remains difficult for both practitioners and academics to be informed about current practices and advances. The literature on healthcare infrastructure is spread across numerous journals, conference proceedings, magazines and focused books in a variety of disciplinary areas. Furthermore, a range of perspectives exist, looking at the role of the environment in health from a broad range of areas like design, psychology, psychological studies, social sciences, health and social care studies, to mention a few. As such, there is no single understanding or a dominant paradigm on how to improve healthcare through the built environment infrastructure.

Past books in the area of healthcare infrastructure have concentrated on the medical or design issues of buildings but none has considered adequately the ‘meeting space’ of management science and built environment technologies with the medical and operational needs of healthcare settings, including future-proofing and considerations of healthcare models of delivery. The purpose of this book is to address some of the key issues related to healthcare delivery with regard to capital investment and infrastructure, design and operations management theories and their application to healthcare. These are looked at in a variety of settings such as primary, acute and home-based. The book is more specifically positioned to address the issues related to the devolution of health and care from acute and secondary care to the primary, intermediary and home care. It also aims to address issues related to public–private partnerships and how these operate in the context of healthcare delivery.

The book brings into one place a compilation of the diverse research and practical examples of improving healthcare delivery through the built environment. We hope this book serves as a useful reference for practitioners and academics who seek to understand and advance the area of built environment for health. This book takes a multidisciplinary approach, with contributions from both theory and practice. Consequently, it has been divided into two main sections: practitioner and academic contributions.

We are aware that there have been aspects of healthcare and the built environment that are not covered in this book. However, we believe that the main thrust of research and practice has been approached. Finally, the book has benefited from international contributions, aiming to keep a global perspective on the challenges around the planning, design, construction and maintenance of healthcare infrastructure.

## 1.1 Part 1: Practitioner contributions

This part brings practitioner’s perspectives and examples of issues and solutions related to the planning, design and delivery of healthcare facilities. Most contributions are from the UK, with the addition of perspectives of improving healthcare through the built environment from the US context.

Chapter 2, by Duane Passman, provides a broad view of planning healthcare environments in the UK. It presents a historical review of investment in the National
Health Service (NHS) built infrastructure, discussing political healthcare agendas and how these have been influencing the design and delivery of facilities. The chapter also describes methods available to the NHS to procure healthcare facilities, emphasising the needs of different organisations across the NHS. The chapter concludes by briefly approaching the importance of good design for healthcare.

Chapter 3, by Sue Francis, centres around designing healthcare environments for change and flexibility. The chapter discusses healthcare policies, changes in policies and how these influence the built environment. The different places where health is delivered, from home to highly specialised hospitals, are presented. Finally, the chapter concentrates on how essential design is for the improvement of services and for staff and patient satisfaction. It also describes design quality measures. The chapter presents examples of award-winning hospital designs.

Chapter 4, by Kate Trant, looks at the role of design in creating individual buildings, as well as how the design of high-quality places contributes to creating healthy neighbourhoods. It discusses some tangible and intangible characteristics of the environment and how they might influence well-being and quality of care. This chapter also presents examples of award-winning hospital designs, which contribute to the creation of healthy neighbourhoods.

Chapter 5, by Richard Groome, describes the process stages in the delivery of primary healthcare facilities through the UK’s LIFT (Local Finance Improvement Trust) procurement. The chapter discusses issues around the different design stages, going through to construction and facilities management. It finalises by bringing to light some cultural differences between public and private sector bodies, and tensions that such differences impose in long-term public–private partnerships such as LIFT.

Chapter 6, by William Lichtig, brings a lean perspective to the delivery of healthcare facilities from a North American perspective. The chapter presents concepts related to lean project delivery and an integrated form of agreement, which are being adopted by a healthcare organisation in California, Sutter Health. It discusses issues around the creation of a collaborative environment for design and construction through a network of commitments, aiming at achieving maximum value for patients and staff.

The final practitioners’ contribution in Chapter 7, by Dave Chambers, continues describing experiences from North America through innovations led by Sutter Health. The chapter centres on a prototype hospital initiative, discussing issues about improving service delivery and patient flows as well as delivering new facilities, and briefly discusses issues around setting goals and metrics and achieving these through building design.

1.2 Part 2: Academic contributions

Part two presents results from current research looking at diverse aspects of the healthcare built environment. Knowledge from a broad range of areas is discussed,
from strategy development and the devolution of care from acute to primary settings and telecare, through to risk management in procurement, design, benefits realisation, continuous improvement, performance management and facilities management in healthcare environments.

Chapter 8, by Ged Devereux, examines the effectiveness of the Strategic Service Development Plan (SSDP) to support the development of built environment solutions for primary healthcare services in the UK. The chapter analyses the development of SSDPs at three UK localities, which are public sector partners forming the Manchester, Salford and Trafford MaST LIFT. The analysis focuses around partnership working, the planning process itself and the realisation of benefits from the projects delivered to the communities.

Chapter 9, by James Barlow, Steffen Bayer, Richard Curry, Jane Hendy and Laurie McMahon, discusses issues around the devolution of care from acute hospitals to primary care and ultimately home, focusing around telecare and the impact it may have on future infrastructure requirements.

Chapter 10, by Nigel Smith, Denise Bower and Bernard Aritua, presents an overview of the management of risk throughout the NHS procurement process. The chapter explores collaborative procurement, as well as multi-project approaches for the delivery of healthcare facilities. It concludes by considering views for the future for sustainable procurement practice.

Chapter 11, by Ricardo Codinhoto, Bronwyn Platten, Patricia Tzortzopoulos and Mike Kagioglou, describes challenges and issues around the creation and adoption of an evidence-base to inform healthcare design development and evaluation. The chapter presents a framework bringing together knowledge from diverse and dispersed research into a single place, to facilitate its adoption in practice.

Chapter 12, by Stelios Sapountzis, Kathryn Yates, Jose Barreiro Lima and Mike Kagioglou, describes a benefits realisation framework developed to support the management of programmes and projects for the delivery of healthcare facilities.

Chapter 13, by Ahmed Ibrahim, Andrew Price and Andrew Dainty, proposes a framework for continuous improvement for the UK Local Improvement Finance Trust (LIFT) initiative. The chapter centres around concepts of continuous improvement and how these can be applied to support LIFT through time.

Chapter 14, by Therese Lawlor-Wright and Mike Kagioglou, focuses on performance management issues and how these have been approached within NHS organisations. The chapter examines issues around performance of healthcare facilities from design through to operation, and concludes with a discussion of how infrastructure may contribute to the performance of healthcare organisations.

Chapter 15, by Igal Sohet and Sarel Lavy, synthesises the state of the art in hard healthcare facilities management, presenting its different components, as well as
key performance indicators. The chapter then examines a case study illustrating the use of the proposed indicators in a hospital setting in Israel. The chapter concludes by offering a view towards a performance maintenance toolkit.

The final chapter, 16, by Igal Sohet, considers the core facilities management concepts of community clinic facilities and compares these with hospital facilities. The chapter presents key performance indicators for community clinic facilities and tests these through a case study.