

Preface

The unprecedented availability of data now affords the opportunity to improve decision making and inform the scientific discovery of best practices for healthcare delivery. This book will serve as a valuable reference for researchers interested in a survey of the state of the art in healthcare operations research and methods that can exploit the opportunities afforded by the available data. It is also intended to be a resource for practitioners interested in identifying opportunities for the implementation of operations research methods to improve healthcare operations. It is suitable for use as a supplementary text for educators offering graduate or senior undergraduate level classes in industrial engineering departments, schools of public health, and business schools.

This book builds on a long history of research and practice involving the application of operations research methods to healthcare delivery. Early work includes inventory planning for blood banks, appointment scheduling at outpatient clinics, and the deployment of emergency vehicles over a geographic region. In recent years there has been a resurgence of interest in healthcare operations management. This has been driven in part by rising costs of healthcare in many countries and concerns about timely access and the quality of care. This book is a unique compilation of chapters on emerging topics including optimization in resource-constrained settings, modeling behavioral aspects of patient care, advances in supply chain management, and the coordination of decision making among multiple parts of an integrated health system. These new applications are, in turn, driving the development of new simulation, optimization, and stochastic models and enriching the methodological foundations of operations research.

Collectively, the chapters in this book address application domains including inpatient and outpatient services, public health networks, supply chain management, and resource-constrained settings in developing countries. Many of the chapters provide specific examples or case studies illustrating the applications of operations research methods across the globe, including Africa, Australia, Belgium, Canada, the UK, and the USA. Chapters 1–4 review operations research methods that are most commonly applied to healthcare operations management including queuing, simulation, and mathematical programming. Chapters 5–7 address challenges

related to inpatient services in hospitals such as surgery, intensive care units, and hospital wards. Chapters 8–10 cover outpatient services, the fastest growing part of many health systems, and describe operations research models for primary and specialty care services and how to plan for patient no-shows. Chapters 12–16 cover topics related to the broader integration of health services in the context of public health, including optimizing the location of emergency vehicles, planning for mass vaccination events, and the coordination among different parts of a health system. Chapters 17–18 address supply chain management within the hospitals, with a focus on pharmaceutical supply management, and the challenges of managing inventory for nursing units. Finally, Chaps. 19–20 provide examples of important and emerging research in the realm of humanitarian logistics.

Ann Arbor, MI, USA

Brian T. Denton



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