

Preface

This book collates some applications of quantitative methods, in particular operational research, statistical and economic decision-making tools, to different concrete situations and problems arising in the broad field of health care delivery. Though presenting “advanced” methods, requiring specialised skills, this book is addressed to an interdisciplinary and wide audience, not just quantitative researchers and economists. It is an excellent reference for practitioners because it presents possible approaches for more informed, and therefore more responsible, decision-making.

Decisions in health care delivery are becoming more and more difficult in the presence of budget cuts and shortages of resources, but overall because of increasing demand and progress in health care delivery models, requiring integrated answers to meet the complex needs of citizens.

The two main features of this book are to collate contributions dealing with new problems and to focus on practical applications.

From the first point of view, the contributions in this book represent the more recent ways of tackling the new challenges in current practice. They do not necessarily require new methods. Traditional methods, such as simulation, optimisation or data envelopment analysis, which are already widely used in the literature, are presented, applied in new ways.

Simulation is largely present because of the intrinsically uncertain context of healthcare and is used for both single facilities and clinical pathways (Chapters 12 and 13), a system where birth centres are seen as a network at a regional level (Chapter 7) and multiobjective comparison in decision making, as in Chapter 5, in an emergency department where the consideration of average and extreme operating conditions are both important.

Optimisation methods are applied to some relatively new topics, such as to team composition and rostering driven by demand in an emergency department (Chapter 1) and to the nurse-to-patient assignment problem (Chapter 8), that is a crucial aspect in meeting the high variability of demand in Home Care. They are also applied in tools for testing the impact of modification of different strategies for the scheduling of interventions in operating rooms to account for uncertainty a posteriori (Chapter 2).

Data envelopment analysis proves, as always, to be a very effective tool in assessing technical and scale efficiency and identifying the determinants of efficiency when used with other statistical instruments, as in Chapter 6. This model can be used, as shown in Chapter 11, also to measure fairness of access and clinical effectiveness together with technical efficiency, allowing a complete assessment of the performance of health care delivery.

Chapter 9 presents methods that are less commonly used in health care. In this chapter multicriteria analysis is used for prioritising community care programmes, taking into consideration both health gains and equity. Chapter 10 presents quite a new method, graph mining, which proves to be a very effective tool to address the actions of policy makers. In Chapter 4 the authors propose an original model to coordinate pharmaceutical industry research on new drugs for rare diseases.

From a methodological point of view, the contributions presented in this book suggest that today an integrated holistic approach is preferable for problem solving. This is the specific aim of Chapter 12, where the clinical pathways of surgical elective patients are considered together within a hospital across the three main sub-processes they follow, that is, waiting list management, operating room planning and stay organisation. This is also the approach followed in Chapter 13, where multiple resources (beds, operating rooms, personnel and intensive care capacity) are taken into consideration to plan admissions of surgical patients by means of many consecutive models.

A holistic approach is even more necessary when all the levels of assistance are involved, as in Chapter 3, where the authors emphasise that alternatives to hospital care require new services, but also corresponding changes to clinical practice and care pathways. This means a participative approach to the whole system and not only a focus on planning and control of the single facility or organisation.

The second key feature of this book is combining, for each topic, a clear explanation of methodological and theoretical concepts together with some reminders of practical applications, and a description of the impact on and benefits to health-care policy. This book proves that whilst the application of quantitative methods in a health care context has its difficulties, due to uncertain conditions and lack of proper data, it also has great potential to provide valuable information to help decision-makers improve services. Rigorous methods are needed and problems should be tackled to make quantitative methods useful and not limited to theoretical exercises.

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