

Preface

Modern healthcare is now fundamentally dependent on decisions that are based on the best evidence available. The current era of evidence-based healthcare has led to a revolution in our understanding of diseases and their treatments. It has also transformed modern medical practice and the training of all levels of healthcare workers. As a result the enhancement of clinical skills is unavoidably intertwined with a basic knowledge of research and methodology.

Acquiring the best evidence is not always straightforward as there is a wide heterogeneity between types of evidence and the variability for each distinct disease, environment and patient population. Sometimes, the evidence is totally non-existent for a specific complaint, whilst other times a large discrepancy exists between evidence sources. The increased application of robust statistics to healthcare research led to a tipping point in our realisation of diseases processes and their management.

The introduction of techniques such as meta-analysis and systematic reviews permitted the mathematical amalgamation of several quantitative studies to derive a unified overall result or treatment conclusion from a variety of data sources. The dissemination of these techniques was gradually appraised by the healthcare community and led to an increased appreciation of different study types and methodologies.

Integrating the results from multiple healthcare studies can be challenging and arduous in view of the complexity of data types and research designs. More importantly, however, the application of older techniques such as meta-analysis is largely dependent on the use of comparative studies presenting quantitative data, which is not always possible. This occurs as there is no appropriate data to combine for some particular diseases (for example the lack of randomised treatment studies in emergency cases which are constrained by ethical limitations). The point of disruptive innovation has however been achieved through the overarching medium of evidence synthesis. Here numerous study types (quantitative or qualitative) can be powerfully amalgamated to derive answers to complex healthcare questions. The application of such methods into evidence-based practice has been traditionally limited to a few individuals and centres that until now have had the expertise to carry out these advanced decision-making approaches.

This book has been designed to offer all healthcare workers the opportunity to understand, carry out and realistically perform a broad range of evidence synthesis techniques. It uniquely offers the reader both practical hands-on knowledge coupled with the theoretical comprehension of evidence synthesis techniques to derive answers for healthcare questions. It covers traditional areas that have been enhanced with cutting-edge advances including the performance of meta-analyses with standard access software. Importantly

however, it offers experience and familiarity with several newer evidence synthesis procedures including cost-effectiveness analysis and decision analysis coupled with workable real-life examples using available software.

We also aim to equip readers with a full scientific grounding in understanding the process of modern evidence synthesis which in turn provides a comprehensive approach to identifying and deriving the best evidence for evidence-based medicine as also assessment of relevant uncertainty and inconsistency. The style of this book is to describe the concepts of these approaches which are then complemented by a step-by-step 'how to do it' methodology. The reader should therefore gain all the skills necessary to study and research evidence whilst also obtaining quantitative knowledge of these from the myriad of sources available.

The broader context of evidence synthesis is also described, as this book is not only intended for clinicians to provide evidence synthesis for the healthcare community, but rather for providing evidence that will have impact for the whole of society. At the highest level, evidence synthesis can provide expert knowledge for healthcare workers, but also the media and policy-makers. Evidence synthesis can guide national and international governmental decisions which as a result carry a heavy impact on worldwide healthcare. Providing the tools to achieve robust evidence synthesis at these levels can empower modern day health staff to offer powerful improvements to healthcare practice.

We hope that readers will benefit from the techniques described in this text to fulfil the ultimate goal of improved healthcare through the provision of radical innovation and superior quality. These can be exposed through a universal evidence-based approach that this text offers. Equipping individuals and institutions with the techniques described herein provides a direct route to translational medicine where bedside questions can be answered at a local, national and international level.

Adopting these evidence synthesis techniques can encourage enhanced learning and understanding of patients, diseases and the overall healthcare process from primary to quaternary care. A greater understanding of evidence synthesis by a larger proportion of the healthcare community can offer greater communication and an earlier adoption of successful treatments. The universal ability to perform evidence synthesis empowers the whole healthcare community to contribute to global information and expertise in evidence such that patient outcomes can be improved and healthcare practices can be strengthened.

The nature of many of the techniques within this book is not static as there are several synthesis methods to answer each question. The reader will be able to choose the most appropriate test or tests for each scenario such that they will have flexibility in their thoughts and decision making. This aspect affords the reader a freedom of thought allied with autonomy and self-determination such that patients can benefit from global trends in healthcare in addition to the best personalised healthcare possible.

The powerful ability of evidence synthesis to integrate data from variable sources whilst decreasing the uncertainty of the result will allow an increased confidence of decision making for clinicians and policy-makers. This renders evidence synthesis not only a powerful tool, but an obligatory constituent of best medical practice for now and the future. The reality of evidence synthesis is unquestionably prevailing; this book aims to offer the opportunity of its use for all healthcare providers with the ultimate aim of better quality of care for all.

Evidence Synthesis in Healthcare
A Practical Handbook for Clinicians

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