

Second edition

How to Read a Paper

The basics of evidence based medicine

Trisha Greenhalgh

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Foreword to the first edition

Not surprisingly, the wide publicity given to what is now called "evidence based medicine" has been greeted with mixed reactions by those who are involved in the provision of patient care. The bulk of the medical profession appears to be slightly hurt by the concept, suggesting as it does that until recently all medical practice was what Lewis Thomas has described as a frivolous and irresponsible kind of human experimentation, based on nothing but trial and error and usually resulting in precisely that sequence. On the other hand, politicians and those who administrate our health services have greeted the notion with enormous glee. They had suspected all along that doctors were totally uncritical and now they had it on paper. Evidence based medicine came as a gift from the gods because, at least as they perceived it, its implied efficiency must inevitably result in cost saving.

The concept of controlled clinical trials and evidence based medicine is not new, however. It is recorded that Frederick II, Emperor of the Romans and King of Sicily and Jerusalem, who lived from 1192 to 1250 AD and who was interested in the effects of exercise on digestion, took two knights and gave them identical meals. One was then sent out hunting and the other ordered to bed. At the end of several hours he killed both and examined the contents of their alimentary canals; digestion had proceeded further in the stomach of the sleeping knight. In the 17th century Jan Baptista van Helmont, a physician and philosopher, became sceptical of the practice of bloodletting. Hence he proposed what was almost certainly the first clinical trial involving large numbers, randomisation, and statistical analysis. This involved taking 200-500 poor people, dividing them into two groups by casting

lots and protecting one from phlebotomy while allowing the other to be treated with as much bloodletting as his colleagues thought appropriate. The number of funerals in each group would be used to assess the efficacy of bloodletting. History does not record why this splendid experiment was never carried out.

If modern scientific medicine can be said to have had a beginning, it was in Paris in the mid-19th century where it had its roots in the work and teachings of Pierre Charles Alexandre Louis. Louis introduced statistical analysis to the evaluation of medical treatment and, incidentally, showed that bloodletting was a valueless form of treatment, though this did not change the habits of the physicians of the time or for many years to come. Despite this pioneering work, few clinicians on either side of the Atlantic urged that trials of clinical outcome should be adopted, although the principles of numerically based experimental design were enunciated in the 1920s by the geneticist Ronald Fisher. The field only started to make a major impact on clinical practice after the Second World War following the seminal work of Sir Austin Bradford Hill and the British epidemiologists who followed him, notably Richard Doll and Archie Cochrane.

But although the idea of evidence based medicine is not new, modern disciples like David Sackett and his colleagues are doing a great service to clinical practice, not just by popularising the idea but by bringing home to clinicians the notion that it is not a dry academic subject but more a way of thinking that should permeate every aspect of medical practice. While much of it is based on megatrials and meta-analyses, it should also be used to influence almost everything that a doctor does. After all, the medical profession has been brainwashed for years by examiners in medical schools and Royal Colleges to believe that there is only one way of examining a patient. Our bedside rituals could do with as much critical evaluation as our operations and drug regimes; the same goes for almost every aspect of doctoring.

As clinical practice becomes busier and time for reading and reflection becomes even more precious, the ability effectively to peruse the medical literature and, in the future, to become familiar with a knowledge of best practice from modern communication systems will be essential skills for doctors. In this lively book, Trisha Greenhalgh provides an excellent approach to how to make best use of medical literature and the benefits of evidence based medicine. It

should have equal appeal for first-year medical students and grey-haired consultants and deserves to be read widely.

With increasing years, the privilege of being invited to write a foreword to a book by one's ex-students becomes less of a rarity. Trisha Greenhalgh was the kind of medical student who never let her teachers get away with a loose thought and this inquiring attitude seems to have flowered over the years; this is a splendid and timely book and I wish it all the success it deserves. After all, the concept of evidence based medicine is nothing more than the state of mind that every clinical teacher hopes to develop in their students; Dr Greenhalgh's sceptical but constructive approach to medical literature suggests that such a happy outcome is possible at least once in the lifetime of a professor of medicine.

Professor Sir David Weatherall

In November 1995, my friend Ruth Holland, book reviews editor of the *British Medical Journal*, suggested that I write a book to demystify the important but often inaccessible subject of evidence based medicine. She provided invaluable comments on earlier drafts of the manuscript but was tragically killed in a train crash on 8th August 1996. This book is dedicated to her memory.

Preface

When I wrote this book in 1996, evidence based medicine was a bit of an unknown quantity. A handful of academics (including me) were enthusiastic and had already begun running “training the trainers” courses to disseminate what we saw as a highly logical and systematic approach to clinical practice. Others – certainly the majority of clinicians – were convinced that this was a passing fad that was of limited importance and would never catch on. I wrote *How to read a paper* for two reasons. First, students on my own courses were asking for a simple introduction to the principles presented in what was then known as “Dave Sackett’s big red book” (Sackett DL, Haynes RB, Guyatt GH, Tugwell P. *Clinical epidemiology – a basic science for clinical medicine*. London: Little, Brown, 1991) – an outstanding and inspirational volume that was already in its fourth reprint, but which some novices apparently found a hard read. Second, it was clear to me that many of the critics of evidence based medicine didn’t really understand what they were dismissing and that until they did, serious debate on the political, ideological, and pedagogical place of evidence based medicine as a discipline could not begin.

I am of course delighted that *How to read a paper* has become a standard reader in many medical and nursing schools and has so far been translated into French, German, Italian, Polish, Japanese, and Russian. I am also delighted that what was so recently a fringe subject in academia has been well and truly mainstreamed in clinical service in the UK. For example, it is now a contractual requirement for all doctors, nurses, and pharmacists to practise (and for managers to manage) according to best research evidence.

In the three and a half years since the first edition of this book was published, evidence based medicine has become a growth industry. Dave Sackett’s big red book and Trisha Greenhalgh’s little blue book have been joined by some 200 other textbooks and 1500 journal articles offering different angles on the 12 topics covered

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briefly in the chapters which follow. My biggest task in preparing this second edition has been to update and extend the reference lists to reflect the wide range of excellent material now available to those who wish to go beyond the basics. Nevertheless, there is clearly still room on the bookshelves for a no-frills introductory text so I have generally resisted the temptation to go into greater depth in these pages.

Trisha Greenhalgh

Preface to the first edition: Do you need to read this book?

This book is intended for anyone, whether medically qualified or not, who wishes to find their way into the medical literature, assess the scientific validity and practical relevance of the articles they find, and, where appropriate, put the results into practice. These skills constitute the basics of evidence based medicine.

I hope this book will help you to read and interpret medical papers better. I hope, in addition, to convey a further message, which is this. Many of the descriptions given by cynics of what evidence based medicine is (the glorification of things that can be measured without regard for the usefulness or accuracy of what is measured; the uncritical acceptance of published numerical data; the preparation of all-encompassing guidelines by self-appointed “experts” who are out of touch with real medicine; the debasement of clinical freedom through the imposition of rigid and dogmatic clinical protocols; and the overreliance on simplistic, inappropriate, and often incorrect economic analyses) are actually criticisms of what the evidence based medicine movement is fighting *against*, rather than of what it represents.

Do not, however, think of me as an evangelist for the gospel according to evidence based medicine. I believe that the science of finding, evaluating and implementing the results of medical research can, and often does, make patient care more objective, more logical, and more cost effective. If I didn't believe that, I wouldn't spend so much of my time teaching it and trying, as a general practitioner, to practise it. Nevertheless, I believe that when applied in a vacuum (that is, in the absence of common sense and without regard to the individual circumstances and priorities of the

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person being offered treatment), the evidence based approach to patient care is a reductionist process with a real potential for harm.

Finally, you should note that I am neither an epidemiologist nor a statistician but a person who reads papers and who has developed a pragmatic (and at times unconventional) system for testing their merits. If you wish to pursue the epidemiological or statistical themes covered in this book, I would encourage you to move on to a more definitive text, references for which you will find at the end of each chapter.

Trisha Greenhalgh

Acknowledgments

I am not by any standards an expert on all the subjects covered in this book (in particular, I am very bad at sums) and I am grateful to the people listed below for help along the way. I am, however, the final author of every chapter and responsibility for any inaccuracies is mine alone.

1. To PROFESSOR DAVE SACKETT and PROFESSOR ANDY HAINES who introduced me to the subject of evidence based medicine and encouraged me to write about it.
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Thanks also to my family for sparing me the time and space to finish this book.

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