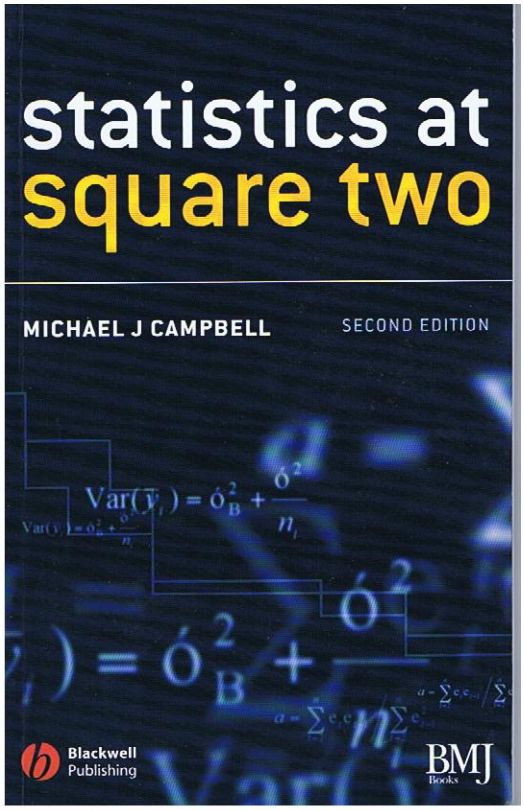

Updated companion volume to the ever popular *Statistics at Square One* (SS1)

Statistical methods used in medical literature are increasingly complex but software available to apply these methods is becoming easier to use. The result is that consumers of the literature now have to grasp sophisticated methods which may be inappropriately applied. This book covers the sophisticated statistical methods and goes beyond the basics of SS1. It reviews the most commonly used modern statistical methods and highlights common misunderstandings. It is easy to read, with annotated computer outputs and a minimum of formulas. It provides worked examples of methods such as multiple and logistical regression and each chapter concludes with exercises to reinforce learning. This book is for all those who need to understand statistics in clinical research papers and apply them in their own research, such as junior doctors and general practitioners.

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Reviews of 1st edition

Statistics at Square Two: Understanding Modern Statistical Applications in Medicine.

M. J. CAMPBELL. London: BMJ Books, 2001, x + 133 pp., $24.95 (P),
ISBN: 0-7279-1394-8.

Statistics at Square Two is a well-written text that can be read without difficulty in a few evenings. The book is an extension of *Statistics at Square One* (Swinscow 1996), which is intended to provide the basic background for understanding of material in *Statistics at Square Two*.

As a light reader, the book would not be suitable for a formal course in statistics (nor do I believe that this is its intended purpose). I found the problem sets given at the end of the .first four chapters (among six) to be of limited value. There were no problems in the last two chapters.

The book, however, might be useful in a short course for physicians and health-care providers. It would most likely need further supplementation in such an instance, at least for short courses offered at my institution that tend to be broader in focus. Although the book would be good reading for those pursuing careers in academic medicine, it could also provide useful material for better understanding and critiquing regression techniques in the medical literature as it might pertain to the adoption of new therapies in clinical practice by a single health-care provider.

For the medical investigator, brief guides for the reporting of statistical results are described in each chapter. Guidelines for the evaluation of a broad range of regression methods that commonly appear in the medical literature are also provided. Topics include linear and logistic regression, survival analysis, random-effects models, and Poisson, ordinal, and time-series regression. The book is not intended to foster statistical proficiency in these areas, but rather to help introduce the reader to more advanced methods of data analysis that extend the limits of the simple comparison of means, medians, and percents. In this light, it could serve as a useful tool for improving communication between a medical investigator and a statistician by simply improving the awareness of common and extremely useful statistical techniques that appear in medical research.

While not going into detail, the author successfully attempts to make the explanations of complex modeling ideas more accessible than those that might be provided in a more technical presentation. Some of the more refreshing concepts (often ignored in the medical literature) include issues relating to model assumptions (goodness of . t, independent errors, heteroscedasticity, independence, the dangers of stepwise regression, and the importance of clinical significance in the absence or presence of statistical significance. There is also a practical side in how the material is presented. For example, the author notes (with care) that, “we can come to a useful conclusion even when the assumptions are not perfectly satisfied” (p. 28).

While there are other strengths in the text, some could also be viewed as weaknesses. For example, in such a shortbook, detailed explanations are avoided in an attempt to make the material easier to read. This could lead to frustration, however, for those who wish to know more. On the other hand, this could also serve as an incentive to seek statistical counselling. Unfortunately, this is not always a solution when statistical resources are limited, as is most often the case. It may be that the book is best read quickly, without the expectation of complete fulfillment on the details of the statistical methods described by the author.

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The American Statistician,November 2002, Vol. 56, No. 4 331

Statistics at Square Two: Understanding Modern Statistical Applications in Medicine
Campbell MJ (2001)
ISBN 0729713948; 133 pages; £12.95
BMJ Books, London; http://www.bmjbooks.com

It does not take a top-class medical researcher to work out that this is a follow-on from Statistics at Square One. This, though, is the first edition of this book. It takes off from where Statistics at Square One stops, describing the analysis (and presentation) of continuous, binary, categorical and survival data. The theme throughout is the analysis in terms of models and, hence, quite a uniform approach is possible – and achieved. Frequent references are made between the chapters (most notably, back to the basic linear regression model described in Chapter 2) so that the ideas of exploring data, testing hypotheses, stratification, effect modification and so on are all considered coherently (both within and between data types). Like its elder sibling, it says little about study design – in fact the preface makes its excuses for saying absolutely nothing about study design.

Chapter 1 is a general overview of data types, significance testing, interval estimation, exploratory and confirmatory analyses, etc. The next three chapters then address linear regression, logistic regression and survival analysis. Chapter 5 gives a rather more cursory description of random-effects models, and the final chapter (headed ‘Other models’) gives even briefer comments about Poisson, ordinal and time-series regression. The book ends with four short appendices on ‘Exponentials and logarithms’ (two pages), ‘Maximum likelihood and significance tests’ (nine pages), ‘Bootstrapping’ (five pages) and ‘Bayesian methods’ (three pages).Each of the main chapters (2–6) follows the same basic outline: a brief description of the model, in what situations it is used, model checking, interpreting computer output (which in all cases is Stata, although SAS gets a couple of mentions), how to report the results in the literature and points to watch out for when reading results. Published examples and small data sets are used throughout for illustration. There is much reference back to Statistics at Square One, and some of the same data sets are used in both books, but this latter text can easily be read independently of the former.

So who is this book aimed at? The subtitle indicates it is a guide to understanding modern statistical applications in medicine, and certainly it is not sufficiently comprehensive to allow statistically na.ıve researchers to competently undertake these sorts of analyses unaided. However, the inclusion of computer output as a matter of routine suggests that it is for those who want to at least get involved in the data analysis. It is not for those who see such menial tasks as the burden of the Statistics Department, whose staff ought to be able to press a few buttons on the computer and get the results out by lunchtime. I believe those who do want to get involved and who are prepared to take the time and effort to work through the book will gain a lot from it. Indeed, I think a good many medical statisticians could benefit from a quick read: it is technically quite easy going (if you have a reasonable grounding in statistics) but the style and unified approach bring things together very well. I was brought up on a diet of GLIM and

GenStat and found it quite strange why some other packages had different modules (procedures, or whatever) for doing logistic regression, probit analysis, analysis of variance, linear regression and so on. Maybe what they lost in coherence, they gained in user-friendliness. Whatever package you prefer, this book is great at describing 'modelling' in many different guises. Nothing is perfect. This book suffers from a large number of mostly trivial but increasingly annoying typographical errors in its presentation of mathematical formulae. Probably most of these will not hinder the reader – although some might. Examples include changes in font and font size, inconsistent use of italicizing symbols for parameters or variables, interchangeable use of the minus sign and the hyphen (-0.7621 and -0.7621, page 43), misplaced suffixes, poor spacing; there are others too. Perhaps the author and the publisher should get together and decide on a style – and then stick to it. An otherwise very good book has been let down because of this.

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(DOI:10.1002/pst

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"This closely written but readable presentation of advanced methods increasingly used in the medical literature uses clinical examples to give meaning to these statistical methods. The experienced author reports the essence of statistical methods with only minimal use of mathematical notation. Underlying concepts are well described in the introductory chapter and in appendices, and the statistical references are excellent. Cautions on the misuse of methods abound. Useful guidance on presentation of methods and results appears in each chapter. Brief presentations of this quality are rare."

Annals of Internal Medicine, December 2001

Errata in Statistics at Square Two MJ Campbell 2nd ed

Page 34 line 6 replace '1 if y' by '1 if X'
Page 40 line -2 replace 'the dependent variables' by 'the independent variables'
Page 75 line 10 x's should be capitals
i.e. Eq 5.1 should be $y_{ij}=\beta_0+z_i+\beta_1 X_{1ij}+\ldots+\beta_p X_{pij}+\varepsilon_{ij}$
Page 75 line 15 replace x_{kij} by X_{kij}
Page 89 line 17 replace λ_{iei} by $\lambda_i e_i$
Page 93 line 12 replace $Pr(Y.y_j)$ by $Pr(Y>y_j)$