APPENDIX 5

Want to Learn More? Further Resources



This book is not designed to give you a detailed understanding of the nitty-gritty details of medical statistics. Instead, we wished to introduce introductory concepts and encourage self-directed learning. Having whetted your appetite if you want to pursue your learning further here is a list of what we consider to be suitable resources. Please note this does not imply that we endorse the contents, they have not been checked in full and we do not take responsibility for their accuracy. You have to navigate at your own risk and make up your mind. You will find a list of books, websites and free statistical software. You may wish to enrol in a course to test and consolidate your statistical learning. If you find it challenging to organise study leave many online courses are available, and some of them are even free.

Good luck!

Books

Altman D. (1991). *Practical Statistics for Medical Research*. London: Chapman and Hall/ CRC. Written by the late Professor Doug Altman, this timeless classic is invaluable for understanding medical statistics.

Bland M. (2015). *An Introduction to Medical Statistics*, 4th edition. Oxford: Oxford University Press. Professor Bland is the other half of the famous Bland–Altman duo and his book is well worth a read.

Campbell MJ, Swinscoe TD. (2009). *Statistics at Square One*, 11th edition. Oxford: Wiley-Blackwell. A perennial best-seller, older editions are available for free on the Internet.

Campbell MJ. (2006). *Statistics at Square Two*, 2nd edition. Oxford: BMJ books. If you are itching for more after having gone through square one, this might be the one to look out for.

Evans I, Thornton H, Chalmers I, Glasziou P. (2011). *Testing Treatments*, 2nd edition. London: Pinter & Martin. This book is available free to download from the Testing Treatments website. Many of the essential concepts of successful trial design and evidence-based practice are discussed in it.

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Field A. (2017). *Discovering Statistics Using IBM SPSS Statistics*, 5th edition. London: Sage Publications Ltd. A popular book among learners of statistics, also useful to learn how to use SPSS.

Freeman JV, Walters SJ, Campbell MJ. (2008). *How to Display Data*. London: Blackwell Publishing. Useful to learn how to display data accurately.

Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (eds). (2019). *Cochrane Handbook for Systematic Reviews of Interventions*, 2nd edition. Chichester: John Wiley & Sons. The most authoritative guide on how to conduct and report a systematic review.

Kirkwood BR, Sterne J. (2003). *Essential Medical Statistics*, 2nd edition. Oxford: Wiley Blackwell. Easy to read, a favourite amongst many a medical researcher.

Perera R, Heneghan C, Badenoch D. (2011). *Statistics Toolkit*. Oxford: Wiley Blackwell. A handy, helpful book from the Oxford Centre for Evidence-Based Medicine team.

Petrie A, Sabin C. (2019). *Medical Statistics at a Glance*. Oxford: Wiley Blackwell. Another useful book.

Websites

British Medical Journal: <u>https://www.bmj.com/</u> over the years BMJ has hosted a number of excellent short articles on various statistical topics of interest that can be accessed via the journal search page; it requires subscription as a BMA member or Athens subscription. A few years back, BMJ hosted a series of statistical articles in the Endgames section that are short, succinct and authoritative – highly recommended.

Best Practice:<u>https://bestpractice.bmj.com/info/us/toolkit/ebm-tools/a-glossary-of-ebm-terms/</u> BMJ best practice requires a subscription but can be accessed via Open Athens or BMA membership. It is an excellent source for statistical terms, resources, as well as statistical calculators.

Centre for Evidence Based Medicine: <u>https://www.cebm.net/</u> the home of The Centre for Evidence-Based Medicine, Oxford, has a large selection of excellent learning resources, including talks and presentations.

Excel Easy: <u>https://www.excel-easy.com/</u> this website has detailed tutorials on how to perform statistical tests in Excel.

Graph Pad: <u>https://www.graphpad.com/guides/prism/8/statistics/index.htm</u> this website has detailed sections on principles of statistics and the practice of statistical analyses. The site is tied-in with the Prism software which is available for a 30-day free trial and allows statistical analyses.

MIT Open Courseware: <u>https://ocw.mit.edu/search/ocwsearch.htm?q=statistics</u> this site is the home of MIT online courses. Statistics and data analysis courses are available. Statistical lecture notes are also available to download for free.

Online StatBook: <u>http://onlinestatbook.com/2/index.html</u> developed by Rice University, University of Houston Clear Lake, and Tufts University, is a free online textbook of statistics.

The Open University: <u>https://www.open.edu/openlearn/</u> The Open University offers a free online course on the fundamentals of medical statistics.

Sampsize: <u>https://app.sampsize.org.uk/</u> is a website and an app for sample size calculation.

SPSS Tutorial: <u>https://www.spss-tutorials.com/basics/</u> this site has several helpful topics that help the reader to navigate through the SPSS software and undertake statistical tests.

Spurious Correlations: <u>http://tylervigen.com/spurious-correlations</u> is a fun blog that demonstrates how easy it is to find spurious correlations and misattribute causation.

Statistically Funny: <u>https://statistically-funny.blogspot.com/</u> is a funny, entertaining and educational blog.

Statistics How To: <u>https://www.statisticshowto.datasciencecentral.com/</u> is another excellent website that teaches statistics in an easy-to-understand format.

Students 4 Best Evidence: <u>https://www.students4bestevidence.net/</u> a network of students interested in evidence-based healthcare; the website features many blogs on medical statistics.

Testing Treatments: <u>https://en.testingtreatments.org/</u> this website gives access to the Testing Treatments book. It is also a rich resource for evidence-based practice and statistical concepts.

Understanding Uncertainty: <u>https://understandinguncertainty.org/</u> this site is produced by the Winton Programme for the public understanding of risk, based in the Statistical Laboratory at the University of Cambridge. The site aims to help improve the way uncertainty and risk are discussed in society, and shows how probability and statistics can be both useful and entertaining!

YouTube: <u>https://www.youtube.com/</u> YouTube is an excellent source of short lectures on individual topics of interest. The lectures are often richly illustrated and have been the inspiration for many images inside this book. Some of the recommended channels include (in alphabetical order), but are not limited to: *Eugene O'Loughlin, LEARN and APPLY: lean and six Sigma, Simple Learning Pro, Statistics 101, statisticsisfun, StatQuest with Josh Starmer, Terry Shaynefelt.*

Free Statistical Software

It may be useful to bear in mind that many of the commonly performed statistical tests can be performed in Excel. However, dedicated statistical software is available for free on the Internet.

JASP: <u>https://jasp-stats.org/</u> is a free statistical software, easy-to-use user-interface.

Mathsisfun: <u>https://www.mathsisfun.com</u> Free online Chi-Squared calculator, for a 2x2 contingency table.

Meta-essentials: <u>https://www.erim.eur.nl/research-support/meta-essentials/</u> is a simple and freely available tool for meta-analysis.

Meta-Mar: <u>http://www.meta-mar.com/</u> is a free online meta-analysis software developed by the Department of Psychology of the University of Marburg.

Open Epi: <u>https://www.openepi.com/Menu/OE Menu.htm</u> a free open-source statistical software.

PASS: <u>https://www.ncss.com/software/pass/</u> a comprehensive tool for sample size calculation, requires a subscription after initial free trial.

PS: power and sample size calculation: <u>https://biostat.app.vumc.org/wiki/Main/</u> <u>PowerSampleSize</u> run by the Department of Biostatistics, Vanderbilt University for power and sample size calculations.

PSPP: <u>https://www.gnu.org/software/pspp/</u> the free version of SPSS! Poor graphical options.

R Project: <u>https://www.r-project.org/</u> free but not for beginners.

RStudio: https://rstudio.com/products/rstudio/ more user-friendly; use after downloading R.

RevMan: <u>https://uk.cochrane.org/author-resources</u> Cochrane collaboration's software for conducting systematic reviews. It is free to download and can be used for non-Cochrane reviews and meta-analysis. Technical support is only available for registered Cochrane reviewers.

Social Science Statistics: <u>https://www.socscistatistics.com/tests/chisquare2/default2.aspx</u> Chi-Squared calculator for larger contingency tables.

SOFA: <u>http://sofastatistics.com/home.php</u> is an excellent free software with the added advantage of better options for data display.