Essential Clinical Statistics Training

For Scientists, Engineers, Healthcare Professionals and Clinicians

Hands-on Interactive Workshops

Given by Dr. John M. Thompson, C.Chem., F.R.S.C., F.R.Stat.Soc.,
At the Institute of Research & Development,
Birmingham Research Park, Edgbaston, Birmingham B15 2SQ

Introductory clinical statistics (one day)

More about clinical statistics (two days)

Statistics for design & analysis of clinical trials of diagnostic technologies (two days)

These are the topics for one and two day hands-on interactive workshops which aim to provide a wide range of in-depth experience of real-life problems and data. They will include, for example, use of electronic calculators (the Casio fx83 GT PLUS) and demonstrations of the excellent statistical Add-in for MS Excel known as Analyse-It which I have used for many years.

For both the "More about clinical statistics" workshop and the workshop on "Statistics for design and analysis of clinical trials of diagnostic technologies", you will be able to download the Analyse-It add-in for personal use for 3 months, via your e-mail, to use in these workshops and for further practice afterwards. Thus, you will need your own laptop with MS Excel and your downloaded personal copy of Analyse-It for use in these workshops.

You will learn about various issues of accuracy and errors, common to all approaches to numerical methods of calculation in applied mathematics and statistics, whether done by hand, with an electronic calculator or using powerful software on laptops.

You will learn both the strengths and weaknesses of each technique taught and how to choose the most appropriate technique for the task through hands-on, interactive "learning by doing". Each participant will be given a full set of the Powerpoint presentations used in the workshop, as well as the tutorial exercises and their solutions for future reference beyond these workshops. CPD certificates of attendance are available on request.

These workshops are all limited to a maximum of 10 delegates to give adequate personal instruction.

Dr. John Thompson has taught statistics and chemometrics in the Schools of Mathematics and Statistics in both Birmingham and Keele Universities and in the Medical School and the School of Chemistry in the University of Birmingham, as well as being a tutor with Statistics for Industry Ltd. He was also a Medical Statistician with the Research and Development Department of the University Hospital of North Staffordshire in which role he ran regular Statistics Advice Clinics for clinicians and healthcare professionals.

He is a director and founder of Tracer Measurement Systems Ltd. based at the Institute of Research and Development at Birmingham Research Park and has been an Honorary Senior Research Fellow in the Molecular Physics Group in the School of Physics and Astronomy in the University of Birmingham for more than 18 years and was a lecturer in Birmingham Medical School for 12 years. For 5 years, he was the co-founder and Technical Director of Dutom Meditech plc, a spin-out from Birmingham Medical School.

He is a Chartered Chemist (C.Chem.), a Fellow of the Royal Society of Chemistry and of the Royal Statistical Society and a former Member of the Institute of Physics and Engineering in Medicine and a former State Registered Clinical Scientist and Engineer. For 13 years, until 2012, he taught on the Keele University Postgraduate Medical School M.Sc. in Biomedical Engineering, leading modules on Medical Equipment and Technology Services Management, Medical Device Design Principles and Healthcare Technology Management as well as running hands-on workshops on Statistics for R&D, Quality and Audit. He has written 5 book chapters in four multi-author advanced texts on statistics and chemometrics.

He has a wide range of experience at senior levels in large companies (Thorn EMI Defence Electronics, Thorn EMI New Business Ventures and Thorn EMI Central Research Laboratories) and various small companies and as a consultant clinical scientist (as Head of Clinical Engineering for North Staffordshire Health Authority and as Head of Biomedical Engineering at University Hospitals Birmingham).

He has worked for many decades as an independent consultant in applied statistics and chemometrics with clients in industry and commerce, the EA, the HSE and NHS. He has run his own commercially-based hands-on statistics training workshops for many years.

For booking forms and available dates contact Dr Thompson at: tracerms@btinternet.com

All places on any workshops must be booked at least two weeks before each workshop date. No bookings can be accepted within two weeks before a particular workshop date.

Introductory Clinical Statistics (one day)

This workshop is designed to empower healthcare professionals and clinicians alike in understanding basic statistical concepts and methods useful for application in the simpler aspects of clinical research. It will include developing an understanding of different types of data, both qualitative and quantitative, which may be obtained in such research.

You will learn how to explore, analyse and summarise these different types of data, including simple ways of putting confidence intervals around those summaries. You will be involved in a sampling and measurement experiment which will enable you to learn important concepts and methods of sampling, measurement, data summary and about confidence intervals. That leads into developing the simplest, most elementary ways of comparing two sets of data

using the data which you have collected. You will also be introduced to the use of 2x2 contingency tables and the Chi-squared test for analysing qualitative data. Several modern but simple and powerful statistical concepts and methods will be learned that are more reliable than many conventional statistical methods.

This workshop relies on simple methods of statistical computation that only need electronic calculators, rather than sophisticated statistical software (although the Analyse-It MS Excel Add-in software will be briefly reviewed and demonstrated towards the end of the workshop).

The cost per participant, **payable in advance**, is £275 plus VAT (£330 including VAT).

More about Clinical Statistics (two days)

This workshop goes well beyond the level of the one-day Introductory Clinical Statistics training workshop which serves as the foundation for progression to this more advanced workshop.

As in the introductory workshop, you will be "learning by doing" with many practical tutorial exercises, sometimes using the Casio fx83 calculator. You will be introduced to the excellent statistical software MS Excel Add-in Analyse-It. All of the participants will learn to use this software in some practical exercises during the two-day workshop.

Ideas about probability and important statistical distributions for both qualitative and quantitative data types will be explored. Ideas about accuracy, precision and bias in measurement will be explored in depth, as will how different methods of calculation can affect the results of computations.

Participants will learn more about contingency table methods, progressing beyond 2x2 to r x c tables, including strengths and weaknesses of these methods.

Various distribution-free (nonparametric) and exploratory methods of analysing and summarising single sets of data will be compared with conventional methods of analysing quantitative data. You will learn about methods of comparing two or more sets of data, including paired and unpaired comparisons and one way Analysis of Variance and very briefly about ANOVA when time is a variable.

From this you will progress to methods of exploring and analysing relationships between variables, including correlation analysis, linear and nonlinear regression analysis. This will include developing insights into the strengths and weaknesses of the various methods presented.

The cost per participant, **payable in advance**, is £525 plus VAT (£630 including VAT).

If both workshops are booked together, as a package, then overall the cost is reduced by £100 from £800 to £700 plus VAT (£840 including VAT).

Statistics for the design and analysis of clinical trials of diagnostic technologies (two days)

This introductory workshop will enable you to learn the basic principles and methods of the modern approaches to design and analysis of clinical trials of diagnostic technologies which have been developed extensively only over the last two decades in particular and apply these to the design and analysis of their own simple trials and understand what kinds of questions to ask statisticians when designing and planning more complex or advanced clinical trials. You will be learning, in various practical exercises, use of the excellent MS Excel Add-in Analyse-It.

You will be expected to have an understanding of and familiarity with the statistical concepts and methods dealt with in the introductory workshop and the more about clinical statistics workshops, as the learning will progress beyond that to include logistic regression methods.

Medical tests for classification and prediction will be explored, so there will be consideration of screening tests, diagnostic tests and possible prognostic applications.

As with clinical trials for therapeutic technologies, the methodology of clinical trials for diagnostic technologies is now considered in various phases from the Phase 1 Exploratory investigations, which use case-control study methods with convenience sampling, through to the Phase 5 Randomised Prospective trials comparing a new diagnostic test with current standard practice. These phases of trialling will be explored in some detail.

You will be introduced to the various elements of study design, including the criteria for a medical test, the scale of the test, selection of study subjects, comparing tests, test integrity and sources of bias, as well as measures of test accuracy. Binary tests will be explored along with study designs for comparing tests using paired and unpaired designs. The use of the ROC (Receiver Operating Characteristic) Curve in evaluating continuous tests will explored using various software with actual data, along with the attributes of and uses for the ROC curve, restrictions and alternatives to the ROC curve and summary indices. You will look at ways of estimating the ROC curve, as well as test sensitivity and specificity.

Finally, an exploration will made of study design for the different study phases, including sample sizes. The ideas about false and true positive and negative outcomes in clinical trials and positive and negative predictive values and test accuracy in that context will also be explained and exercises in evaluating these will be done.

The cost per participant, **payable in advance**, is £525 plus VAT (£630 including VAT).