## Models In Medicine II. Introduction to Resampling and Bayesian Models

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"*Handouts*" containing copies of all of the slides will be provided at the time of the lecture.

For the present we provide a list of references and appropriate software.

## List of References

Barnett, V. (1982) Comparative Statistical Inference. 2<sup>nd</sup> ed. John Wiley & Sons. NY.

Berger, J. and Wolpert, R. (1988) *The Likelihood Principle*. 2<sup>nd</sup> ed. Inst. of Mathematical Statistics. Hayward, CA.

Bernardo, J.M. and Smith, A.F.M. (1994) Bayesian Theory. John Wiley & Sons. NY.

Berry, D.A. (1993) A Case for Bayesianism in Clinical Trials (with discussion) *Statistics in Med.* 12: 1377-1404.

Berry, D.A. and Stangl, D.K. (1996) *Bayesian Biostatistics*. Marcel Dekker, Inc. NY. Basel.

Box, G.E.P. and Tiao, G.C. (1973) *Bayesian Inference in Statistical Analysis*. Addison-Wesley. Reading, MA.

Carlin, B.P. and Louis, T.A. (2000) *Bayes and Empirical Bayes Methods for Data Analysis*. Chapman & Hall/CRC. Boca Raton, FL.

DuMouchel, W.H. and Harris, J.E. (1983) Bayes Methods for Combining the Results of Cancer Studies in Humans and Other Species (with comments & rejoinder). *J. Amer. Statis. Assn.* 78: 293-315.

Efron, B. and Tibshirani, R.J. (1998) An Introduction to the Bootstrap. CRC Press. Boca Raton, FL.

Gelman, A., Carlin, J.B., Stern, H.S. and Rubin, D.B. (1995) *Bayesian Data Analysis*. Chapman & Hall/CRC Press. Boca Raton, FL.

Gigerenzer, G., Swiftink, Z., Porter, T., Daston, L. Beatty, J. and Kruger, L. (1989) *The Empire of Chance. How Probabilities Changed Science and Everyday Life.* Cambridge Univ. Press. Cambridge, UK

Gilks, W.R., Richardson, S. and Spiegelhalter, D.J., Eds. (1996) *Markov Chain Monte Carlo in Practice*. Chapman & Hall/CRC. Boca Raton, F. and London.

Good, P. (2000) *Permutation Tests. A Practical Guide to Resampling Methods for Testing Hypotheses.* 2<sup>nd</sup> ed. Springer. NY.

Herbert, D.E. (2002) Contending Models for Causal Inference: Population, randomization, Bayesian, Dynamical. An overview. In *Biological & Physical Basis of IMRT & Tomotherapy*. 199-250. Paliwal, B.R., Herbert, D.E., Fowler, J.F. and Mehta, M.P., eds. Proc. of the Sixth Intl. Conf. on Dose, Time and Fractionation in Radiation Oncology. Madison, WI. Sept. 23-25. 2001. AAPM Sympo. Proc. No. 12. Medical Physics Publishing. Madison, WI.

Kass, R.E., Carlin, B.P., Gelman, A. and Neal, R.M. (1998) Markov Chain Monte Carlo in Practice: A Roundtable Discussion. *American Statistician*. 52: 93-100.

Manly, B.F.J. (1998) *Randomization, Bootstrap and Monte Carlo Methods in Biology*, 2<sup>nd</sup> ed. Chapman & Hall. London.

Parmigiani, G. (2002) *Modelling in Medical Decision Making. A Bayesian Approach.* John Wiley & Sons. NY.

Raftery, A. and Richardson. S. (1996) Model Selection for Generalized Linear Models via GLIB: Application to Nutrition and Breast Cancer. In *Bayesian Statistics*. B. Berry and D. Stangl, eds. Marcel Dekker, NY.

Sprent, P. (1998) Data Driven Statistical Methods. Chapman & Hall. London.

Zellner, A. (1971) An Introduction to Bayesian Inference in Econometrics. John Wiley & Sons. NY.

## Models in Medicine II.

## Introduction to Resampling and Bayesian Models. Statistical Software Packages

The statistical packages listed below provide the **minimal software** required for effective implementation of the statistical procedures described in the lecture. There are many other packages available. They can be readily located by *Google* on the Internet (all of the vendors maintain current websites). Independent assessments and comparisons of competing packages can be found in various journals. For example, *The American* 

*Statistician* provides very useful reviews. A guide to currently available software for Bayes's models can be found as Appendix C in *Bayes and Empirical Bayes Methods for Data Analysis*, 2<sup>nd</sup> ed, B. Carlin and T. Louis (2000) Chapman & Hall/CRC, Boca Raton.

- 1. **SYSTAT 10.2.** (6 volumes). SYSTAT Software. Richmond, CA. 2002. (*Statistics*)
- 2. **StatXact 5.0.** Statistical Software for Exact Nonparametric Inference. User Manual (2 volumes). Cytel Software Corp. Cambridge, MA. 2001. (*Permutation tests*)
- 3. **Re-Sampling Stats** User's Guide. J.L. Simon. Resampling Stats Inc. Arlington, VA. 1999.(*Permutation tests, Bootstrap estimates*)
- 4a. FAST\*PRO. Software for Meta-Analysis by the Confidence Profile Method. D. M. Eddy and V. Hasselblad. Academic Press. NY. 1992. (*Bayes models. Meta-Analysis*)
- 4b. Meta-Analysis by the Confidence Profile Method. The Statistical Synthesis of Evidence. D.M. Eddy, V. Hasselblad and R. Shachter. Academic Press. NY. 1992. (*Bayes models. Meta-analysis*)