

Applied Bayesian statistics in medical research and health-care evaluation

Description

The Bayesian approach to medical research offers a flexible framework allowing for the incorporation of new information and evidence as it accrues. Although Bayesian statistics is often perceived and discussed as controversial, this course is not about controversies, but about pragmatic ways of integrating available information in a coherent fashion. The course is building on applied problems and exercises that require the participants to bring their own portable computer (->requirements).

Objectives

- To understand the role of Bayesian statistics in medical research and health-care evaluation, trial monitoring, and prediction
- To provide sources for detailed information on Bayesian methods
- To provide insight into available computational tools and presentation techniques for Bayesian analysis
- To highlight the need for sensitivity analysis and the dangers of naïve use of Bayesian methods
- To provide the basis for a unified statistical approach that allows to approach problems of analysis and design in a structured way

Dates

14 – 16 March 2011

Eligibility and Requirements

Participants should have a good understanding of basic biostatistical and epidemiological principles with regard to data analysis and study design. Further, participants should know how to interpret parameters and results from standard data analyses using linear and generalised linear models.

Requirement: Participants should bring their own laptop with a Windows operating system (NT2000 or later).

Course Software: WinBUGS, and R (both freeware)

Course structure

Day		Contents
1	Morning (9.15-12.15)	<ul style="list-style-type: none"> • Introduction to Bayesian methods: basic principles, probabilities • Inference for binary data • Making predictions for binary data • Practicals using R: Analysis of binary data, predictions on number of successes in additional N patients
	Afternoon (13.30-16.30)	<ul style="list-style-type: none"> • Bayesian analysis with normal data • Practicals using R: Applying conjugate normal Bayesian analysis
2	Morning (9.15-12.15)	<ul style="list-style-type: none"> • Case Study : phase II studies in oncology incorporating adaptive allocation to 4 treatment arms • Practicals with WinBUGS: Introduction to WinBUGS, replicating conclusions of oncology case study
	Afternoon (13.30-16.30)	<ul style="list-style-type: none"> • Generalized linear models in WinBUGS • Introduction to simulation-based Bayesian analysis (Markov Chain Monte Carlo algorithms) • Practicals: Data analysis of repeated measurements without and with random effects in WinBUGS

PhD Program Management:

Academic lead: Prof. Charlotte Braun-Fahrlander
 Program coordination: Dr. Sina Henrichs
 Administration: Nicole Bosshard

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3	Morning (9.15-12.15)	<ul style="list-style-type: none"> • Bayesian approaches to evidence synthesis and meta-analysis • Practicals: Case study of the magnesium trials in cardiology – prediction revisited. • Issues when incorporating prior information
	Afternoon (13.30-16.30)	<ul style="list-style-type: none"> • Special topics: Monitoring of clinical trials, Forward sampling example, Questions and answers • Exam

Assessment

Based on a case study an in-class exam will have to be completed. The exam will be similar in scope and difficulty to the practicals done in the first 2.5 days.

Credits

1 ECTS

Facilitators

Dr. Thomas Gsponer, Senior Expert Statistical Methodologist, Institute of Social and Preventive Medicine, University of Berne

Thomas Gsponer graduated in 2000 from the 'Institute of Mathematics' at the 'Swiss Federal Institute of Technology Lausanne' (EPFL) in Switzerland with a Master's degree in Applied Statistics ('MSc in Mathematics'). In 2004 he received a PhD degree in Statistics from EPFL. In 2004, he joined Novartis Pharma in Basel, Switzerland, where he gained experience in the drug development process and in the use of Bayesian methodology in drug development. In 2007 he joined Statoo Consulting in Berne where he worked as Senior Statistical Consultant in Applied Statistics where he applied Bayesian methodology in Biostatistics, Epidemiology, Design of Experiments and statistical process control. In 2009 he joined the Institute of Social and Preventive Medicine at University of Berne where he is working as a Senior Expert Statistical Methodologist.

Prof. Marcel Zwahlen, Institute of Social and Preventive Medicine, University of Berne

Marcel Zwahlen has a Master of Science in Physics from the University of Bern and a PhD in Epidemiology from Johns Hopkins University, USA. Among other things, he is currently involved in analyzing several longitudinal studies. In the last years he has taken an active interest in systematic reviews and evidence synthesis including the use of Bayesian approaches in the evaluation of health-care interventions. He is currently at the Institute of Social and Preventive Medicine in Berne where he holds a position as assistant professor of epidemiology which is funded by the Swiss School of Public Health Plus.

Location

Institute of Social and Preventive Medicine (ISPM)
Finkenhubelweg 11
CH-3012 Bern
See www.ispm.ch for map

Course fee

PhD in Public Health candidates registered with SSPH+ register free of charge
Other PhD students: CHF 300.-
Academics: CHF 850.--
Others: CHF 1250.—

Registration

Online at www.ispm-unibas.ch/ssphplus

DEADLINE

PLEASE REGISTER BY 15 February 2010

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