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AKSTA Biostatistics

2 VO *Achim Zeileis* & 2 UE *Bettina Grün*

Vorbesprechung: Freitag, 2007-03-02, 10:00 Uhr, SEM 107/1 (Goldenes Lamm)

Biostatistics is the study of statistics as applied to biological areas (in particular, to medical data and clinical studies). What is special about it? Some statistical methods are more heavily used in biostatistics than in other fields, such as e.g. permutation tests, survival analysis or the analysis of categorical data.

Outline syllabus:

- **Basic concepts and designs:** controlled vs. uncontrolled designs, clinical trials, placebo, (double) blind trials, randomization.
- **Describing variables:** qualitative vs. quantitative information, univariate vs. extended data, statistics derived from counts/ranks/moments.
- **Graphical methods:** histogram, box plot, bar plot, scatter plot, mosaic plot, spine plot, association plot.
- **Inference:** t , F , χ^2 , binomial, Wilcoxon, Ansari-Bradley, Kruskal-Wallis, McNemar, Mantel-Haenszel tests; conditional inference, permutation tests.
- **Regression:** linear models, ANOVA, generalized linear models, odds ratios, logistic regression, loglinear modelling, multinomial models, proportional odds logistic regression.
- **Survival analysis:** survivor/hazard function, censoring, Kaplan-Meier survival curve, log-rank test, Cox's proportional hazards model.

Exercises and examples illustrate all statistical techniques introduced based on the open source statistical software package R, see <http://www.R-project.org/>.