Medical statistics, informatics and telemedicine

lecture 1 hour/week practice 1 hour/week 2 credits

Tutor: Dr Dániel Veres

week	lecture topic	practice topic
1	Principles of quantitative medicine.	Introduction. *Data types.* Introduction to data types.
2	Summary of data: descriptive statistics	*Graphical representation of data and interpretation of plots I.* Ploting frequencies: visualization of samples with a large number of elements on a histogram, bar plot.
3	Event, probability, distribution.	*Graphical representation of data and interpretation of plots II.* Box plots, scatter plot, mosaic plot. Outliers. Interpreatation of percentile curves. *Descriptive values.* Determination of descriptive values from a large sample size.
4	Estimations.	*Distributions.* Using binomial distributions. Using normal ditributions.
5	Principles of hypothesis testing in medical practice.	*Reference interval.* Approximate calculation for normal distribution. Interpretation. *Confidence intervals.* Simple calculation of the confidence interval of mean. Interpratation.
6	T-tests; chi-square tests. Multiplicity.	*Hypothesis tests*. Logic of hypothesis tests.
7	Correlation. Simple linear regression.	*Student t-tests*. Making t-tests. Interpretation of effect size, confidence interval and p-value. *Multiplicity*. Examples for multiple testing.
8	Arguing.	*Correlation, regression*. Interpretation of corerlation coefficient. Making simple linear regression, interpretation of the slope.
9	Linear regression as a tool against confounding,	*Arguing*. Examples. *Bias*. Examples
10	Evaluation of diagnostic tests.	*Regression models.* Interpreting the results of regression models.
11	ROC curves. Likelihood ratios.	*Diagnostic tests I.* Evaluation of diagnostic tests. Examples drom the literature.
12	Our own research, diploma work, dialogue with the statistician: How much is enough? How not to make a very bad questionnaire? How to make a good data table?	*Diagnostic tests II.* ROC curves. Likelihood ratios.
13	Introduction to medical decision theory, Bayesian theory: a priori and a posteriori distributions, learning model.	*Preparing data*. Organizing data tables.
14	Databases, expert systems, AI supported diagnostics, BigData.	When and how to ask a statistician. *Questionnaires.* Reflection on a questionnaire - how not to do very badly.