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EZR

Although there are many commercially available statistical software packages, only a few implement a competing risk analysis or a proportional hazards regression model with time-dependent covariates.

In addition, most packages are not clinician friendly, as they require that commands be written based on statistical languages.

A report describes the statistical software 'EZR' (Easy R), which is based on R and R commander. EZR enables the application of statistical functions that are frequently used in clinical studies, such as survival analyses, including competing risk analyses and the use of time-dependent covariates, receiver operating characteristics analyses, meta-analyses, sample size calculation and so on, by point-and-click access. EZR is freely available on

(http://www.jichi.ac.jp/saitama-sct/SaitamaHP.files/statmed.html) and runs on both Windows (Microsoft Corporation, USA) and Mac OS X (Apple, USA). A report provides instructions for the installation and operation of EZR¹.

Statistical functions of EZR For discrete variables

Frequency distributions/cr Confidence interval for a proportion

One sample proportion test

Confidence interval for a difference between two proportions

Confidence interval for a ratio of two proportions

Compare two proportions (Fisher's exact test and Chi-square test)

Compare proportions of two paired samples (McNemar test)

Compare proportions of more than two paired samples (Cochran Q test)

Cochran-Armitage test for trend in proportions

Logistic regression

For continuous variables

Numerical summaries

Smirnov-Grubbs test for outliers

Kolmogorov-Smimov test for normal distribution

Confidence interval for a mean

Single-sample t-test

Two-variances F-test

Two-sample t-test

Paired t-test

Bartlett's test

One-way ANOVA

Repeated-measures ANOVA

Multi-way ANOVA

ANCOVA

Test for Pearson's correlation

Linear regression

For nonparametric tests for continuous variables

Mann Whitney U test

Wilcoxon's signed rank test

Kruskal-Wallis test

Friedman test

Jonckheere-Terpstra test

Spearman's rank correlation test

For survival analysis

Kaplan-Meier survival curve and logrank test Logrank trend test Cox proportional hazard regression Cox proportional hazard regression with time-dependent covariate Cumulative incidence of competing events and Gray test Fine-Gray proportional hazard regression for competing events

For diagnostic test analysis

Accuracy of qualitative test Kappa statistics for agreement of two tests Compute positive and negative predictive values ROC curve analysis for quantitative test Compare two ROC curves Cronbach's alpha coefficient for reliability

For matched-pair analysis

Extract matched controls (This function relys on optmatch package and is limietd to academic use.) Mantel-Haenzel test for matched proportions Conditional logistic regression for matched-pair analysis Stratified Cox proportional hazard regression for matched-pair analysis

For meta-analysis and meta-regression test

Meta-analysis and meta-regression test for proportions Meta-analysis and meta-regression test for means Meta-analysis and meta-regression test for hazard ratios

For smaple size and power calculation

Calculate sample size from control and desired response rates Calculate sample size from proportion and confidence interval Calculate sample size or power for comparison with specified proportion Calculate sample size or power for comparison between two proportions Calculate sample size for non-inferiority trial of two proportions Calculate sample size from standard deviation and confidence interval Calculate sample size or power for comparison between two means Calculate sample size or power for comparison between two paired means Calculate sample size or power for comparison between two survival curves

For drawing graphs

Bar graph(Frequencies) Pie chart(Frequencies) Stem-and-leaf display Histogram QQ plot Bar graph(Means) Line graph(Means) Line graph(Repeated measures) Boxplot Dot chart Ordered chart Scatterplot Scatterplot matrix Adjusted survival curve Stacked cumulative incidences

Statistical functions from original R commander

Principal-components analysis Factor analysis k-means cluster analysis Hierarchical cluster analysis Summarize hierarchical clustering Add hierarchical clustering to data set Linear hypothesis Varianceinflation factor Breusch-Pagan test for heteroscedasticity Durbin-Watson test for autocorrelation RESET test for nonlinearity Bonferroni outlier test Basic diagnostic plots Residual quantile-comparison plot Component+residual plots Added-variable plots Influence plot Effect plots

1)

Kanda Y. Investigation of the freely available easy-to-use software 'EZR' for medical statistics. Bone Marrow Transplant. 2013 Mar;48(3):452-8. doi: 10.1038/bmt.2012.244. Epub 2012 Dec 3. PubMed PMID: 23208313; PubMed Central PMCID: PMC3590441.

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