

Practical "Multivariable survival analysis"

P9

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Exercise 1 Use the same dataset `bromo.sav` as in the previous practical. Variables are

- **sex**: gender (0=female, 1=male)
 - **dose**: dose of 1-bromopropane in ppm
 - **event**: event indicator (1=death, 0=censored)
 - **time**: time to death or end of study (730 days for males, 729 for females)
 - **count**: frequency of observation
- (a) Evaluate the effects of the dose groups and gender on survival in one analysis and make a statement about the direction and magnitude of the effect sizes. Is gender confounding the association between dose and death?
SPSS tip: Tell SPSS about the frequency with which each record occurred by clicking Data – Weight Cases and selecting the appropriate variable. Then perform Cox regressions with dose in 4 categories alone and together with gender. For that, click Analyze – Survival – Cox Regression and fill in the form. Do not forget to specify dose as a 4-category variable. Click on Categorical and select variable **dose**. Select the Indicator Contrast with the first category as the reference and confirm by clicking on Change.
- (b) Use continuous dose instead of categorical dose in order to evaluate a trend in survival with increasing dose.
SPSS tip: As above without specifying variable **dose** as a categorical variable.

Exercise 2 The data `anderson.sav` consists of remission time data for two groups of leukemia patients with 21 patients in each group. Variables are

- **rx**: treatment (0=treatment, 1=placebo)
 - **sex**: gender
 - **logWBC**: log white blood cell count, a well-known prognostic indicator of survival for leukemia patients
 - **lwb3**: logWBC divided into low, medium and high values
 - **status**: event indicator (1=relapse, 0=censored)
 - **survt**: time to relapse or end of study in weeks
- (a) Check the proportional hazards assumption for the covariates. Use **lwb3** to check the assumption for **logWBC**.
SPSS tip: For plotting the cumulative hazard function, click Analyze – Survival – Kaplan-Meier and fill in the form. Request the hazard to be plotted under Options. Do this for each covariate. Alternatively, click Analyze – Survival – Kaplan-Meier and fill in the form. Request that the hazard is saved by clicking on Save, which creates a new variable. Calculate the negative natural logarithm of the new variable by clicking Transform – Compute Variable. Then calculate the natural logarithm of survival time and plot both variables against each other by clicking Graphs – Legacy Dialogs – Scatter/Dot – Simple.

- (b) Run a Cox-PH model for the data by using stratification.
SPSS tip: Click Survival – Cox Regression and use the box Strata.
- (c) Compare the stratified model with separate models.
SPSS tip: Create groups by clicking Data – Split File. Then, click Compare Groups.