

Survival Data Analysis for Cancer Data

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1- Introduction to survival data (2h courses, 3 hours tutorials)

We start with the definition of survival (failure time) data, and the description of their specificities. A brief review of probability distributions for survival data is given. We then develop the concept of likelihood for model parameter estimation in presence of right censoring, then that of nonparametric estimation. Kaplan-Meier estimator of survival function is presented. Last, Wald, likelihood ratio, and score tests for drawing statistical inference are presented, and formulae for sample size computations are derived.

2- Regression models for survival data (2h courses, 3 hours tutorials)

We introduce the concept of partial likelihood function for right-censored data, and discuss the main regression models for hazard function. We discuss the inference and model checking for fitting such models. Composite endpoints used in Cancer (event-free survival, progression free survival, etc.) are presented and discussed.

3- Introduction of the competing risks framework (2h courses, 3 hours tutorials)

We describe the setting of competing risks, and describe the probability functions for such data. Nonparametric estimator of probability distribution is derived as well as statistical testing and regression models. Strategy of modeling is discussed.

4- Multistate modeling for multivariate survival data (2h courses, 3 hours tutorials)

We consider recurrent survival data and multiple survival data, with examples from Cancer settings. We discuss the modeling strategies according to the type of data, comparing marginal models with conditional models.

5- Modeling clustered survival data (2h courses, 3 hours tutorials)

We describe modeling approaches for clustered survival data: stratified models, fixed and random effects modeling. We describe permutation tests for cluster effect on a covariate, such as treatment-by-cluster interaction in clinical trials settings.

Publicazioni più significative

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Jacob L, Uvarova M, Boulet S, Begaj I, [Chevret S](#). Evaluation of a multi-arm multi-stage Bayesian design for phase II drug selection trials - an example in hemato-oncology. *BMC Med Res Methodol*. 2016 Jun 2;16:67.

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Lemiale V, Mokart D, Resche-Rigon M, Pène F, Mayaux J, Faucher E, Nyunga M, Girault C, Perez P, Guitton C, Ekpe K, Kouatchet A, Théodose I, Benoit D, Canet E, Barbier F, Rabbat A, Bruneel F, Vincent F, Klouche K, Loay K, Mariotte E, Bouadma L, Moreau AS, Seguin A, Meert AP, Reignier J, Papazian L, Mehziari I, Cohen Y, Schenck M, Hamidfar R, Darmon M, Demoule A, [Chevret S](#), Azoulay E; Groupe de Recherche en Réanimation Respiratoire du patient d'Onco-Hématologie (GRRR-OH). Effect of Noninvasive Ventilation vs Oxygen Therapy on Mortality Among Immunocompromised Patients With Acute Respiratory Failure: A Randomized Clinical Trial. *JAMA*. 2015 Oct 27;314(16):1711-9.

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