Politecnico di Torino – Dipartimento di Scienze Matematiche
Didattica di eccellenza nel Dottorato in Matematica Pura e Applicata

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.

Pubblicazioni più significative

Maury S, Chevret S, Thomas X, Heim D, Leguay T, Huguet F, Chevallier P, Hunault M, Boissel N, Escoffre-Barbe M, Hess U, Vey N, Pignon JM, Braun T, Marolleau JP, Cahn JY, Chalandon Y, Lhéritier V, Beldjord K, Béné MC, Ifrah N, Dombret H; for GRAALL.. Rituximab in B-Lineage Adult Acute Lymphoblastic Leukemia. N Engl J Med. 2016 Sep 15;375(11):1044-53.

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.

Galimard JE, Chevret S, Protopopescu C, Resche-Rigon M. A multiple imputation approach for MNAR mechanisms compatible with Heckman's model. Stat Med. 2016 Jul 30;35(17):2907-20.

Biard L, Labopin M, Chevret S, Resche-Rigon M. Acute Leukaemia Working Party of the EBMT. Investigating covariate-by-centre interaction in survival data. Stat Methods Med Res. 2016 May 10.

Groheux D, Biard L, Giacchetti S, Teixeira L, Hindié E, Cuvier C, Vercellino L, Merlet P, de Roquancourt A, de Cremoux P, Resche-Rigon M, Espié M. ^{18}F-FDG PET/CT for the Early Evaluation of Response to Neoadjuvant Treatment in Triple-Negative Breast Cancer: Influence of the Chemotherapy Regimen. J Nucl Med. 2016 Apr;57(4):536-43.

Servais S, Dumontier N, Biard L, Schnepf N, Resche-Rigon M, Peffault de Latour R, Scieux C, Robin M, Meunier M, Xhaard A, Sicre de Fontbrune F, Le Goff J, Socié G, Simon F, Mazeron MC. Response to antiviral therapy in haematopoietic stem cell transplant recipients with cytomegalovirus (CMV) reactivation according to the donor CMV serological status. Clin Microbiol Infect. 2016 Mar;22(3):289.e1-7.

Chasset F, Pages C, Biard L, Roux J, Sidina I, Madelaine I, Basset-Seguin N, Viguier M, Madjlessi-EzrA N, Schneider P, Bagot M, Resche-Rigon M, Lebbe C. Single-center study under a French Temporary Authorization for Use (TAU) protocol for ipilimumab in metastatic melanoma: negative impact of baseline corticosteroids. Eur J Dermatol. 2015 Jan-Feb;25(1):36-44.

Chevret S, Seaman S, Resche-Rigon M. Multiple imputation: a mature approach to dealing with missing data. Intensive Care Med. 2015 Feb;41(2):348-50.

Caruana E, Chevret S, Resche-Rigon M, Pirracchio R. A new weighted balance measure helped to select the variables to be included in a propensity score model. J Clin Epidemiol. 2015 Dec;68(12):1415-22.e2.

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, Mehzari 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.

Lapidus N, Chevret S, Resche-Rigon M. Assessing assay agreement estimation for multiple left-censored data: a multiple imputation approach. Stat Med. 2014 Dec 30;33(30):5298-309.

Biard L, Porcher R, Resche-Rigon M. Permutation tests for centre effect on survival endpoints with application in an acute myeloid leukaemia multicenter study. Stat Med. 2014 Jul 30;33(17):3047-57.

Resche-Rigon M, White IR, Bartlett JW, Peters SA, Thompson SG; PROG-IMT Study Group. Multiple imputation for handling systematically missing confounders in meta-analysis of individual participant data. Stat Med. 2013 Dec 10;32(28):4890-905.

Chevret S. Bayesian adaptive clinical trials: a dream for statisticians only? Stat Med. 2012 May 20;31(11-12):1002-13.

Castaigne S, Pautas C, Terré C, Raffoux E, Bordessoule D, Bastie JN, Legrand O, Thomas X, Turlure P, Reman O, de Revel T, Gastaud L, de Gunzburg N, Contentin N, Henry E, Marolleau JP, Aljijakli A, Rousselot P, Fenaux P, Preudhomme C, Chevret S, Dombret H; Acute Leukemia French Association. Effect of gemtuzumab ozogamicin on survival of adult patients with de-novo acute myeloid leukaemia (ALFA-0701): a randomised, open-label, phase 3 study. Lancet. 2012 Apr 21;379(9825):1508-16.

Pirracchio R, Resche-Rigon M, Chevret S. Evaluation of the propensity score methods for estimating marginal odds ratios in case of small sample size. BMC Med Res Methodol. 2012 May 30;12:70.

Resche-Rigon M, Pirracchio R, Robin M, De Latour RP, Sibon D, Ades L, Ribaud P, Fermand JP, Thieblemont C, Socié G, Chevret S. Estimating the treatment effect from non-randomized studies: The example of reduced intensity conditioning allogeneic stem cell transplantation in hematological diseases. BMC Blood Disord. 2012 Aug 16;12:10.

Deslandes E, Chevret S. Assessing surrogacy from the joint modelling of multivariate longitudinal data and survival: application to clinical trial data on chronic lymphocytic leukaemia. Stat Med. 2007 Dec 30;26(30):5411-21.

Katsahian S, Resche-Rigon M, Chevret S, Porcher R. Analysing multicenter competing risks data with a mixed proportional hazards model for the subdistribution. Stat Med. 2006 Dec 30;25(24):4267-78.

Latouche A, Boisson V, Chevret S, Porcher R. Misspecified regression model for the subdistribution hazard of a competing risk. Stat Med. 2007 Feb 28;26(5):965-74.

Resche-Rigon M, Chevret S. Local influence for the subdistribution of a competing risk. Stat Med. 2006 Jun 15;25(11):1937-47. PubMed PMID: 16158402.

Katsahian S, Porcher R, Mary JY, Chevret S. The graft-versus-leukaemia effect after allogeneic bone-marrow transplantation: assessment through competing risks approaches. Stat Med. 2004 Dec 30;23(24):3851-63.

Latouche A, Porcher R, Chevret S. Sample size formula for proportional hazards modelling of competing risks. Stat Med. 2004 Nov 15;23(21):3263-74.

CALENDARIO:

02/10/17 13:00 to 18:00 CHEVRET
Introduction to survival data (2h courses, + 3 hours tutorials)

03/10/17 13:00 to 18:00 RESCHE-RIGON
Regression models for survival data (2h courses, +3 hours tutorials)

04/10/17 13:00 to 18:00 CHEVRET
Introduction of the competing risks framework (2h courses, +3 hours tutorials)

05/10/17 13:00 to 18:00 CHEVRET
Multistate modeling for multivariate survival data (2h courses, +3 hours tutorials)

06/10/17 8:00 to 13:00 RESCHE-RIGON
Modeling clustered survival data (2h courses, +3 hours tutorials)