

Statistical Applications and Research

Most of the faculty at the Statistical Center are supported for a fraction of their time on an R01, Statistical Methods for Clinical Studies. Dr. LeBlanc is the PI. The emphases currently are design and analysis strategies for Phase III trials and survival analysis (particularly graphical and other exploratory methods). Methodological publications are given below.

Methodological Publications

1998

1. Moinpour CM, Lovato LC. Ensuring the quality of quality of life data: the Southwest Oncology Group experience. *Stat Med* 17:641-651.
2. Troxel AB. A comparative analysis of quality of life data from a Southwest Oncology Group randomized trial of advanced colorectal cancer. *Stat Med* 17:767-779.
3. Troxel AB, Fairclough DL, Curran D and Hahn EA. Statistical analysis of quality of life data in cancer clinical trials. *Stat Med* 17:653-666.
4. Zhang H, Crowley J, Sox H, Olshen RA. Tree structured statistical methods. In: Armitage, P; Colton, T, ed. *Encyclopedia of Biostatistics*, New York: Wiley: p. 4561-4573.
5. Crowley, J: Interpreting clinical trials 2. Factorial designs, subset analyses, and intent to treat. Thirty-Fourth Annual Meeting, Los Angeles Convention Center. American Society of Clinical Oncology Educational Book, 253-259.

1999

1. Gooley TA, Leisenring W, Crowley J, et al. Estimation of failure probabilities in the presence of competing risks: new representations of old estimators. *Stat Med* 18:695-706.
2. LeBlanc M, Crowley J. Using the bootstrap for estimation in group sequential design: an application to a clinical trial for nasopharyngeal cancer. *Stat Med* 18:2635-2644.
3. LeBlanc M, Crowley J. Adaptive regression splines in the Cox model. *Biometrics* 55(1):204-213.
4. Tangen CM, Koch GG. Complementary nonparametric analysis of covariance for logistic regression in a randomized clinical trial. *J Biopharm Stat* 9(1):45-66.
5. Tangen CM, Koch GG. Nonparametric analysis of covariance for hypothesis testing with logrank and Wilcoxon scores and survival rate estimation in a randomized clinical trial. *J Biopharm Stat* 9(2):307-338.

6. Koch GG, Tangen CM. Nonparametric analysis of covariance and its role in non-inferiority clinical trials. *Drug Information Journal* 33:1145-1159.
7. Liu PY, Tsai WY. A modified logrank test for censored survival data under order restrictions. *Statistics and Probability Letters* 41:57-63.
8. Liu PY, LeBlanc M, Desai M. False positive rates of randomized phase II designs. *Control Clin Trials* 20:343-352.
9. Laird NM, Pauler DK. Discussion of "Adjusting for nonignorable drop-out using semiparametric nonresponse models" by DO Scharfstein, A Rotnitzky and JM Robins. *Journal of the American Statistical Association* 94:1133-1135.
10. Pauler DK, Wakefield JC, Kass RE. Bayes factors for variance component models. *Journal of the American Statistical Association* 94:1242-1253.
11. Pauler DK. Discussion of "Quantifying surprise in the data and model verification" by MJ Bayarri and JO Berger. In *Bayesian Statistics 6*, eds. Bernardo JM, Berger JO, Dawid AP and Smith AFM. Oxford: Clarendon Press pp.70-72.
12. LeBlanc, M. Resampling quantile estimating functions and density estimation. *Computational Statistics and Analysis* 29:163-176.

2000

1. Tangen CM, Koch GG. Non-parametric covariance methods for incidence density analyses of time-to-event data from a randomized clinical trial and their complementary roles to proportional hazards regression. *Stat Med* 19:1039-1059.
2. Mick R, Crowley JJ, Carroll RG. Phase II clinical trial design for noncytotoxic anti-cancer agents for which time to disease progression is the primary endpoint. *Control Clin Trials* 21(4):343-359.
3. Liu PY, Anderson G, Crowley J. Observational studies and randomized trials: Letter to the editor. *N Engl J Med* 343(16):1195.
4. Pauler DK, Laird NM. A mixture model for longitudinal data with application to assessment of noncompliance. *Biometrics* 56:464-472.
5. Pauler DK, Wakefield JC. Modeling and Implementation Issues in Bayesian Meta-Analysis. In: Stangl, D; Berry D, ed. *Bayesian Meta-Analysis*. New York: Marcel-Dekker; p.205-230.

2001

1. Liu, PY. 'Phase II selection designs". In: Crowley J, ed. *Handbook of Statistics in Clinical Oncology*. New York: Marcel-Dekker; p. 119-127.
2. Skates SJ, Pauler DK and Jacobs IJ. Screening based on the risk of cancer calculation from Bayesian hierarchical change-point models of longitudinal markers. *Journal of the American Statistical Association* 96:429-439.

3. Tangen CM, Koch GG. Nonparametric analysis of covariance for confirmatory randomized clinical trials to evaluate dose-response relationships. *Stat Med* 20:2585-2607.
4. Green SJ. Factorial Designs for Time to Event Endpoints. In: Crowley J, ed. *Handbook of Statistics in Clinical Oncology*. New York: Marcel-Dekker
5. Gooley TA, Leisenring W, Crowley J, Storer BE. Why kaplan-meier fails and cumulative incidence succeeds when estimating failure probabilities in the presence of competing risks. In: Crowley J, ed. *Handbook of Statistics in Clinical Oncology*. New York: Marcel-Dekker; p. 513-523.
6. Crowley J, Jacobson J, Alexanian R. Standard-dose therapy for multiple myeloma: the Southwest Oncology Group experience. *Semin Hematol* 38(3):203-208.
7. Hoque A, Albanes D, Lippman SM, Spitz D, Taylor PR, Klein E, Thompson IM, Goodman PJ, Stanford JL, Crowley JJ, Coltman CA, Santella RM. Molecular epidemiologic studies within the selenium and vitamin E cancer prevention trial (SELECT). *Cancer Causes Control* 12:627-633.
8. Faraggi D, LeBlanc M, Crowley J. Understanding neural networks using regression trees: an application to multiple myeloma survival data. *Stat in Med* 20:2965-2976.
9. Crowley J, ed. *Handbook of Statistics in Clinical oncology*. New York: Marcel-Dekker.
10. Kooperberg C, Ruczinski I, LeBlanc M, Hsu L. Sequence analysis using logic regression. *Genet Epidemiol* 21:626-631.
11. LeBlanc M: Tree-based methods for prognostic stratification. In: Crowley, J, ed. *Handbook of Statistics in Clinical Oncology*. New York: Marcel-Dekker; p.457-472.

2002

1. LeBlanc M, Jacobson J, Crowley J. Partitioning and peeling for constructing patient outcome groups. *Stat Methods Med Res* 11:1-28.
2. LeBlanc M: Regression Trees. In: El-Shaarawi, A; Piegorsch, W, ed. *Encyclopedia of Environmetrics*. Wiley; p. 1734-1738.
3. LeBlanc M: Tree structured methods. In: El-Shaarawi, A; Piegorsch, W, ed. *Encyclopedia of Environmetrics*. Wiley; p. 2242-2243.
4. Pauler DK, Laird, NM. Nonlinear hierarchical methods for monitoring compliance. *Stat Med* 21(2):219-220.
5. Green S, Benedetti J, Crowley J. *Clinical Trials in Oncology*, second edition. Chapman and Hall/CRC, London.
6. Green S, Liu PY, O'Sullivan J. Factorial design considerations. *J Clin Oncol* 20(16):3424-3430, 2002.

7. Pauler DK, Finkelstein DM. Predicting time to prostate cancer recurrence based on joint models for non-linear longitudinal biomarkers and event time outcomes. *Stat Med* 21:3897-3911, 2002.
8. Pauler DK, Gower KB, Goodman PJ, Crowley JJ, Thompson IM. Biomarker-based methods for determining noncompliance in a prevention trial. *Control Clin Trials* 23:675-685, 2002.
9. Gatsonis C, Carriquiry A, Gelman A, Higdon D, Kass RE, Pauler DK, Verdinelli I, (eds). *Case Studies in Bayesian Statistics Vol. VI. Lecture Notes in Statistics 167*. New York:Springer, 2002.
10. Abdoell M, LeBlanc M, Stephens D, Harrison RV. Binary partitioning for continuous longitudinal data: categorizing a prognostic variable. *Stat in Med* 21:3395-3409, 2002.
11. Ruczinski I, Kooperberg C, LeBlanc M. Logic regression methods and software. In proceedings of the MRSI workshop, Workshop on nonlinear estimation and classification, Springer, 333-344, 2002.
12. Kooperberg C, Sipione S, LeBlanc M, Strand A, Cattaneo E, Olson JM. Evaluating test statistics to select interesting genes in microarray experiments. *Hum Mol Genet* 11(19):1-10, 2002.
13. Donaldson GW, Moinpour CM. Individual differences in quality-of-life treatment response. *Med Care* 40(6 Suppl):III-39—III-53, 2002.

2003

1. Pauler DK, McCoy S, Moinpour C. Pattern mixture models for longitudinal quality of life studies in advanced stage disease. *Stat Med* 22:795-809, 2003.
2. Unger JM, LeBlanc M, Crowley JJ, et al. Estimating the impact of new clinical trial proven cancer therapy and cancer chemoprevention on population mortality: The Karnofsky Memorial Lecture. *J Clin Oncol* 21(23s):246-252, 2003.

2004

1. Tangen CM, Goodman PJ, Crowley JJ, Thompson IM. Statistical design issues and other practical considerations for conducting phase III prostate cancer prevention trials. *J Urol* 171:S64-S67, 2004.
2. Liu PY, Sondak VK. In: Machin D, Day S and Green S, *Textbook of Clinical Trials*. Wiley; 2004. Melanoma chapter; p. 149-158.
3. Green S, Pauler DK. Statistics in Clinical Trials, *Current Oncology Reports* 6(1):36—41, 2004.
4. Green S. Do estimates of long-term survival tell us whether patients diagnosed with breast cancer before age 50 years are ever cured? Editorial. *J Clin Oncol* 22(3):392-394, 2004.

5. LeBlanc M, Moon J, and Crowley J. Directed peeling and covering of patient rules, recent advances and trends in nonparametric statistics, edited by Michael J. Akritas and Dimitris N. Politis, 393-407, 2004.
6. Ruczinski I, Kooperberg C, LeBlanc ML. Exploring interactions in high-dimensional genomic data: an overview of logic regression, with applications. *Journal of Multivariate Analysis* 90:178-195, 2004.
7. Pauler DK, Hardin J, Faulkner J, Leblanc M, and Crowley JJ. Survival Analysis with Gene Expression Arrays. In *Handbook of Statistics Vol. 23*, eds. CR Rao and N Balakrishnan, Elsevier North Holland: Amsterdam, pp. 675—688, 2004.
8. Hardin J, Waddell M, Page CD, Zhan F, Barlogie B, Shaughnessy J Jr, Crowley J. Evaluation of multiple models to distinguish closely related forms of disease using DNA microarray data: an application to multiple myeloma. *Stat Appl Genet Mol Biol* 3(1):1-21, 2004.

Statisticians usually give presentations at the Group Meeting on some aspect of the design, conduct, or analysis of cancer clinical trials. The titles of these presentations since 1998 are:

- Brent Blumenstein: Some Statistical Thoughts about Tumor Markers and Related Things. Spring 1998.
- Joseph Unger: Southwest Oncology Group Accrual by Sex, Race and Age, Compared to U.S. Population Rates. Spring 1998.
- John Crowley: Informatics: A Status Report. Fall 1998.
- Stephanie Green: Factorial Designs. Spring 1999.
- PY Liu: Cisplatin, 5-Fluorouracil Plus Radiation Therapy are Superior to Radiation Therapy as Adjunct Therapy in High-Risk, Early-Stage Carcinoma of the Cervix after Radical Hysterectomy and Pelvic Lymphadenectomy: Report of a Phase III Intergroup Study. Spring 1999.
- Phyllis Goodman: Design of the Selenium and Vitamin E Cancer Prevention Trial (SELECT—S0000). Spring 2000.
- PY Liu: False Positive Rates of Randomized Phase II Designs. Fall 2000.
- John Crowley: Data and Safety Monitoring Committees: Theory and Practice. Spring 2001.
- Joe Unger (and Charles Coltman Jr., M.D.): Is there a future for federally funded clinical trials? Fall 2001.
- John Crowley: Analysis of Microarray Data. Fall 2002.

- Joseph Unger: African Americans Have Worse Survival in Hormone-Related Cancers. Spring 2003.
- Phyllis Goodman: Design of the Prostate Cancer Prevention Trial (PCPT). Fall 2003.
- Joseph Unger: Accrual Patterns of the Southwest Oncology Group by Sex, Race/Ethnicity and Age: Updated and Expanded Analysis. Spring 2004.
- Cathryn Rankin: Dose Effect of Imatinib in Patients with Metastatic GIST-Phase III Sarcoma Group Study S0033. Spring 2004.

Literature Cited

1. Albain KS, Crowley JJ, LeBlanc M, Livingston RB: Determinants of improved outcome in small cell lung cancer: An analysis of the 2,580-patient Southwest Oncology Group database. *J Clin Oncol* 8:1563-1574, 1990.
2. Albain KS, Crowley JJ, Livingston RB: Long-term survival and toxicity in small cell lung cancer: Expanded Southwest Oncology Group experience. *Chest* 99:1425-1432, 1991.
3. Albain KS, Crowley JJ, LeBlanc M, Livingston RB: Survival determinants in extensive stage non-small cell lung cancer: The Southwest Oncology Group experience. *J Clin Oncol* 9:1618-1626, 1991.
4. Crowley J, Green S, Liu PY, Wolf M: Data monitoring committees and early stopping guidelines: The Southwest Oncology Group experience. *Stat Med* 13:1391-1399, 1994.
5. Dahlberg S, Fisher RI, Coltman CA, Jr.: African Americans treated on SWOG NHL studies: similar incidence, received dose intensity, and outcome to Caucasian patients. *ASCO Proceedings* 13:370(#1251), 1994.
6. Flaherty L, Unger J, Liu PY, Albain KS, Sondak V: Gender differences and independent predictors of survival in patients with metastatic malignant melanoma. *ASCO Proceedings* 15:433, 1996.
7. Fleming T, Green S, Harrington D: Considerations for monitoring and evaluating treatment effects in clinical trials. *Control Clin Trials* 5:55-66, 1984.
8. Green S, Dahlberg S: Planned vs attained design for Phase II clinical trials. *Stat Med* 11:853-862, 1992.
9. Hutchins L, Rector D, Stotts C, Dahlberg S, Coltman CA Jr., Albain K: Analysis of Southwest Oncology Group (SWOG) accrual for sex ratios and associated socioeconomic status (SES) factors. *ASCO Proceedings* 13:188 (#539), 1994. Abstract
10. Modiano M, Villar-Werstler P, Crowley J, Salmon S: Evaluation of race as a prognostic factor in multiple myeloma: An ancillary of Southwest Oncology Group study 8229. *J Clin Oncol* 14:974-977, 1996.
11. Hutchins LF, Unger JM, Crowley JJ, Coltman CA Jr, Albain KS: Underrepresentation of patients 65 years of age or older in cancer treatment trials. *N Engl J Med* 341(27):2061-2067, 1999.