BioM&S: Biomathematics and Biostatistics Working Group

UNIVERSITY of GUELPH

*Department of Mathematics and Statistics*

**BioM&S Symposium 2008**

**8.45am, September 3, 2008.**

**Thornborough 1307, University of Guelph.**

FIELDS

# Gordon C Ashton Biometric Lecture

## Professor James Hanley, McGill.

### *A new way to fit smooth-in-time hazard functions, a Cox regression / ANCOVA paradox, and statistical analyses for an unusual clinical trial design*


**Abstract**

The talk with deal with three topics. The main one will be a new way to fit smooth-in-time log-linear hazard models. The approach borrows from the 'case-control' (i.e., choice-based, or outcome-based, sampling) study design that is widely used in epidemiology and in other fields. It allows us to fit the models using standard logistic regression software. The approach accommodates and extends a wide range of hazard models, including the Gompertz and Weibull distributions. The focus is on using clinical-trial -- and non-experimental – data to produce estimates of cumulative incidence. These estimates can serve as profile-specific (i.e., individualized) "risk" estimates for persons who wish to know the difference in t-year risk if they adopt a life-style change, or choose one treatment intervention over another. The approach also helps to further unify epidemiologic designs and survival analysis.

I will also briefly deal with Cox's semi-parametric regression model, and illustrate – using data, with no censoring, from a study of the cost of reproduction on the longevity of male fruitflies -- a well established but poorly understood paradox, (Gail, Wieand & Piantadosi; Biometrika 1984) where the covariate-adjusted estimates of treatment effect produced by analysis of covariance and by Cox regression can go in opposite directions from the unadjusted ones.

Finally, I will describe an unusual randomized clinical trial design used to compare technologies / techniques used in assisted human reproduction, and some statistical challenges in the analysis of the data it generates.