A. John Petkau

Current Research Interests

Most of my current research activity is stimulated by collaborations with subject-area researchers. Such activity allows statisticians to contribute directly to advancement of general scientific knowledge and often reveals critical needs for new statistical methodology. My primary interests are in the development, evaluation and application of statistical methodology for the design and analysis of clinical and epidemiological studies.

My long-time application area of focus has been multiple sclerosis (MS). The scope for involvement of statisticians in MS research expanded dramatically in the early 1990's due to two related developments: the use of magnetic resonance imaging (MRI) of the brain to evaluate patient status and the discovery of therapies of proven benefit. The UBC Hospital MS Clinic was among the first in the world to use MRI for assessing MS disease status and was a key participant in the initial Betaseron clinical trial, the first to lead to an approved therapy for MS. Multiple new treatments have been proven to be efficacious over the subsequent years, and UBC continues to provide a fertile environment for MS research.

My MS involvement has led, among other things, to serving on data safety and monitoring boards for MS clinical trials and on task forces organized by national and international bodies such as the MS Society of Canada and the US National MS Society that are concerned with evaluating therapies in MS. Statistical issues that have arisen in different collaborations include: designs for clinical trials with interim analyses, designing trials based on multidimensional outcome measures, approaches to assessing putative surrogate outcomes, methods for the analysis of longitudinal data, models for the longitudinal MRI lesion count data now collected as part of all MS clinical trials, approaches to monitoring safety based on detecting unusual increases in MRI lesion counts in individual patients, models for sample size determination based on the within-lesion signal intensities intended for proof-of-concept trials assessing emergent therapies focused on tissue repair, approaches to assessing the benefit of therapies in the clinical practice setting, and methods for assessing the calibration of risk prediction models.

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