

Report by Esmè Jordaan on attendance of the 32nd Annual Conference of the International Society for Clinical Biostatistics (ISCB)

On 21-25 August 2011, the 32nd Annual Conference of the International Society for Clinical Biostatistics (ISCB) was held at the new Ottawa Convention Centre. Opening in April 2011, Canada's Meeting Place was the ideal venue to hold this conference. Overlooking Ottawa's Rideau Canal and surrounded by Ottawa's national and cultural sites in a relaxed urban vibe, the new Centre was within easy walking distance of many stores and restaurants in the downtown Ottawa area.

The 32nd Annual Conference in Ottawa provided a forum for the international exchange of theory, methods and applications of biostatistics in medical research and practice among statisticians, epidemiologists and medical researchers working or interested in the field of clinical biostatistics.

There were about 400 delegates, mostly from Europe and the UK, and then also from Canada and the US, India, the Eastern countries and other. Myself (Esmè Jordaan) and Tarylee Reddy were the only two delegates from Africa.

The Scientific Themes included

Models in Epidemiology
Models in Survival Data
Biomarkers
Causal Models
Meta-Analysis
Clinical Trials
Adverse Events
Statistical Methods
Non-Randomised Studies

The title of the president's Invited Speaker, Professor Nan Laird, Professor of Biostatistics at the Harvard School of Public Health, was "The Challenges of Finding Genes in the Age of Association".

The invited sessions were

- 1) Issues in Systematic Reviews of Epidemiological and Prognostic
- 2) Towards Stratified Medicine – Modeling Interactions between Treatment and Continuous Markers
- 3) Latent Class Analysis in Diagnostic Studies
- 4) Relative Survival Estimation and Modeling
- 5) Innovative Statistical Methods in Drug Development
- 6) Statistical analysis of next-generation sequencing data in epidemiological studies

In his presentation titled "Issues in Systematic Reviews of Epidemiological and Prognostic Studies" D.G. Altman from the University of Oxford posed a very relevant question for the research done at the MRC "Why do people do studies if they do not add to the knowledge?" He also talked about the importance of external validation, more cautious interpretation and better reporting quality to improve the overall quality of research. For prognostic studies, the goal should be prediction for future data, not maximal fit for the primary data, i.e. AUC. The question should be "How well does the model work?" Future research can only be made better by sample sharing, but systematic reviews need good data and reporting. The importance of registering biomarker studies was also discussed.

My own research is in the field of latent class modeling. The poster I presented was titled "Latent Class Analysis to Assist in Identifying Schizophrenia Subtypes" and was work done in collaboration with Dana

Niehaus from Department of Psychiatry & Stikland Hospital, University of Stellenbosch. The work was an application of latent class models and a simulation study of the influence of sample size on the resulting parameter estimates., and therefore the interpretation of the results.

In this regards, P.S. Albert from the NICH/NIH in Bethesda discussed the “Estimation of diagnostic accuracy from designs with no gold standard, partial gold standard, or imperfect gold standard”. This was discussed in the context of multiple binary tests. Many authors have used latent class modeling approaches for estimating diagnostic accuracy and prevalence. However, there is a lack of robustness with having no gold standard information and it is difficult to distinguish between models with different dependence structures. Using semi-latent class models and imputation techniques, it was shown that partial gold standard information (even as little as 20%) improves the robustness substantially. An approach using an imperfect reference test also improves the robustness. Methodological work was supported with examples from the medical literature.

Albert also referenced one of the other speakers, N. Dendukuri from McGill University, Montréal whose talk was titled “Bayesian Meta-Analysis of Diagnostic Test Accuracy in the Absence of a Gold-Standard Reference Test” by. Another talk on the same topic was “Identifiability of Models for Diagnostic Testing in the Absence of a Gold standard” by G. Jones and W.O. Johnson who also mentioned work done by Dendukuri and Josephs (2001). Dendukuri was also a co-author of the paper by J.A. de Groot titled “Correcting for Differential Verification Bias: A Bayesian Approach”. In this study the authors proposed a Bayesian model to simultaneously correct for the problem of differential verification bias and adjust for the imperfect nature of the reference standards using a latent class. This is in a situation where verification cannot be done by the preferred reference standard and has to be done by a different reference standard, and these two standards often are of different quality, leading to differential verification bias.

An application of latent class models for diagnostic accuracy was presented by A. Subtil *et.al.* from Portugal titled “Bayesian Latent Class Models for Estimating Malaria Prevalence and Diagnostic Test Accuracy”. They studied the performance of three diagnostic tests-a rapid diagnostic test, the microscopy and the polymerase chain reaction technique. They used Bayesian latent class models with and without restrictions to estimate the disease prevalence, together with sensitivities and specificities. and predictive values of the diagnostic tests.

There was one other poster in this field “Patterns of Diabetes Related Primary Care Utilization and Predicting Factors: An Application of Multilevel Latent Class Analysis” by T. Hoekstra from VU university, Amsterdam.

Joint modeling, which models the relationship between a longitudinal response and a time-to-event has become increasingly popular in medical research, since this approach analyses both types of data simultaneously and can serve to reduce bias and improve precision in estimates of covariate effects. STATA and R were used for analysis.

One of the mini-symposiums was on “Current and emerging Statistical Issues in Vaccine Research”. This session consisted of six presentations and a general discussion. One of the presentations was titled “Group sequential Methods for Observational Data Incorporating Confounding through Estimating Equations with Application in Post-Marketing Vaccine/Drug Surveillance by A.J. Cook from Group Health Research Institute in Seattle and co-workers from U.S. FDA. This was a fascinating talk about conducting observational post-marketing vaccine and drug safety surveillance to detect rare adverse events not identified pre-licensure. Prospective observational data is used and the data is updated as often as weekly.

In general the conference was a huge success with many opportunities to interact with biostatisticians from all over the world.