Location:
University of Calgary
Theatre 4
Health Sciences Centre
Foothills Campus

Dates:
June 8, 2016

Topic:
In health research, we are often interested in knowing how effective treatments are and how destructive exposures are. A deep understanding of the research questions greatly depends on the valid evaluation of the research conducted and the correct interpretation of the data collected. Randomized controlled trials (RCTs), where subjects are randomly allocated to treatments and exposures, are the gold standard in these settings; however, RCTs may not be feasible and affordable in most cases due to ethics and cost issues. Causal inference tackles the challenges of confounding in observational studies and provides novel statistical methods to draw causal conclusions based on observational data in a comprehensive framework.

Methodology:
The speaker gave in-person public lectures. The participants attended this workshop either in-person or remotely via video conferencing. In addition the lectures were videotaped and made available on line afterwards.

Objectives Achieved:
The main objective achieved of the 1-day workshop was to introduce causal inference to the diverse community of researchers at the University of Calgary to strengthen the university's research strengths in medicine, epidemiology and public health. It also served as a forum for the presentation of recent advances in the field to facilitate knowledge sharing and stimulate the development of innovative methodologies among methodologically oriented and subject matter-motivated researchers.

Scientific Highlights:
Workshop participants included epidemiologists, biostatisticians, applied statisticians, medical/health researchers and those in other allied disciplines (e.g., psychology, sociology), and graduate students at the University of Calgary as well as researchers from partner organizations, including

Alberta Health Services. The workshop was be advertised broadly to other research institutes in Western Canada. In the end we had around 70 in-person and 100 online participants.

The workshop was specifically targeted at graduate students and post-doctoral fellows at the University of Calgary. Apart from being workshop participants, a few student volunteers was involved in the actual running of the workshop itself.

Organizers:
Hua Shen, PhD, Department of Mathematics and Statistics, University of Calgary
Ying Yan, PhD, Department of Mathematics and Statistics, University of Calgary
Alexander R. de Leon, Department of Mathematics and Statistics, University of Calgary

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Speakers:
Dr. Erica Moodie (PhD, University of Washington) is a William Dawson Scholar, an Associate Professor of Biostatistics, and Director of the Biostatistics Program in the Department of Epidemiology, Biostatistics, and Occupational Health at McGill University. Her main research interests are in causal inference and longitudinal data analysis with a focus on dynamic treatment regimes. She is an Elected Member of the International Statistical Institute, an Associate Editor of Biometrics and the Journal of the American Statistical Association. She holds a Chercheur-Boursier junior 2 career award from the Fonds de recherche du Quebec-Sante. Dr. Moodie is co-author of the monograph "Statistical Methods for Dynamic Treatment Regimes: Reinforcement Learning, Causal Inference, and Personalized Medicine."

Workshop details:
Title -- Introduction to Causal Inference: Philosophy, Framework, and Key Methods

Abstract:
In this workshop, causal inference will be introduced from first principles, surveying approaches for a single-interval through to methods for longitudinal data. Beginning with the philosophical developments of causality as the study of etiology, confounding and the counterfactual framework will be explained. The propensity score and the concept of covariate balance will then be considered. Finally, estimators of marginal effects will be considered, focusing first on the effect of a time-fixed treatment and then proceeding to the more complex setting of time-varying treatments.

Sub-sections (each 1.5h)
1. Causality, confounding and the counterfactual framework
2. Propensity scores and covariate balance
3. Marginal effects for time-fixed treatments
4. Marginal effects for time-varying treatments

Links:

https://www.eventbrite.ca/e/introduction-to-causal-inference-philosophy-framework-key-methods-tickets-24600409487#

Comments / Miscellaneous:
The workshop took place in Theatre 4, Health Sciences Center on June 8, 2016. There were 170 participants in total, among which 70 people attended in person while about 100 people attended via webinar. The speaker was Dr. Erica Moodie from the Department of Epidemiology, Biostatistics & Occupational Health at McGill University. At first, the speaker gave a fairly comprehensive review about the basic practice of causal inference including "Causality, Confounding and the Counterfactual Framework" and "Propensity Scores and Covariate Balance", then Dr. Moodie went over some exercises where the audience learned how to apply some of the techniques introduced on real problems in the session of "Marginal Effects for Time-fixed Treatments". In the last session "Marginal Effects for Time-varying Treatments", Dr. Moodie presented more advanced research topics for the audience who are interested in the methodology development rather the application only.

File Uploads:
Additional Upload 1:
http://www.pims.math.ca/files/final_report/June8-UCalgary-Workshop_on_Causal_Inference-print.pdf