



McGill

Department of
Epidemiology, Biostatistics
and Occupational Health

Biostatistics Seminars

Fall 2020



Margarita Moreno-Betancur, PhD

Senior Research Fellow at
The University of Melbourne and the
Murdoch Children's Research Institute (MCRI)

Mediation Effects that Emulate a Target Randomized Trial: Evaluation of Ill-Defined Interventions on Multiple Mediators

Wednesday, November 25, 2020

3:30 pm – 4:30 pm – [Zoom Link](#)

Abstract: Many epidemiological questions concern potential interventions to alter the pathways presumed to mediate an association. For example, we consider a study that investigates the benefit of interventions in young adulthood for ameliorating the poorer mid-life psychosocial outcomes of adolescent self-harmers relative to their healthy peers. Two methodological challenges arise. Firstly, mediation methods have hitherto mostly focused on the elusive task of discovering pathways, rather than on the evaluation of mediator interventions. Secondly, the complexity of such questions is invariably such that there are no existing data on well-defined mediator interventions (i.e. actual treatments, programs, etc.) capturing the populations, outcomes and time-spans of interest. Instead, to address these questions researchers must rely on exposure (non-intervention) data, that is, on mediator measures such as self-reported substance use and employment. We address the resulting challenges by specifying a target trial addressing three policy-relevant questions, regarding the impacts of hypothetical (rather than actual) interventions that would shift the mediators' distributions (separately, jointly or sequentially) to user-specified distributions that can be emulated with the observed data. We then define novel interventional effects that map to this trial, emulating shifts by setting mediators to random draws from those distributions. We show that estimation using a g-computation method is possible under an expanded set of causal assumptions relative to inference with well-defined interventions. These expanded assumptions reflect the lower level of evidence that is inevitable with ill-defined interventions. Application to the self-harm example using data from the Victorian Adolescent Health Cohort Study illustrates the value of our proposal for informing the design and evaluation of actual interventions in the future.

Bio: Dr Margarita Moreno-Betancur is Senior Research Fellow at The University of Melbourne and the Murdoch Children's Research Institute (MCRI). Supported by a fellowship from the Australian Research Council, she leads a team of postdoctoral biostatisticians and PhD students, on a program combining research in causal inference and missing data methods with collaborative statistical work on longitudinal studies in child and adolescent health.

She is a lead investigator of the Victorian Centre for Biostatistics (VicBiostat) and Head Statistician of the MCRI's LifeCourse Initiative, comprised of over 40 longitudinal cohort studies.

Website: <http://www.vicbiostat.org.au/research/causal-inference-health-data-science-advancing-understanding-and-methods>

www.mcgill.ca/epi-biostat-occh/news-events/seminars/biostatistics