

Invitation

Transporting insights
from experimental design
into environmental
epidemiology

Tuesday
18 July 2017
Time 13:00

Room 1, 1st Floor,
Tassos Papadopoulos Building,
Themidos & Ifigenias Corner,
Limassol



Cyprus
University of
Technology

Cyprus International
Institute for Environmental
and Public Health

Information:
Tel.: 25002246
www.cut.ac.cy



The Cyprus International Institute for Environmental and Public Health of the Cyprus University of Technology, organise a lecture on:

Transporting insights from experimental design into environmental epidemiology

Speaker: Marie-Abèle Bind, Research Associate
Department of Statistics, Harvard University Faculty of Arts and Sciences

Abstract

The health effects of environmental exposures have been studied for decades, typically using standard regression models to assess exposure-outcome associations found in observational non-experimental data. We propose and illustrate a different approach to examine causal effects of environmental exposures on health outcomes from observational data. Our strategy attempts to structure the observational data to approximate data from a hypothetical, but realistic, randomized experiment.

This approach, based on insights from classical experimental design, involves four stages, and relies on modern computing to implement the effort in two of the four stages. More specifically, our strategy involves: 1) a conceptual stage that involves the precise formulation of the causal question in terms of a hypothetical randomized experiment where the exposure is assigned to units; 2) a design stage that attempts to reconstruct (or approximate) a randomized experiment before any outcome data are observed, 3) a statistical analysis comparing the outcomes of interest in the exposed and non-exposed units of the hypothetical randomized experiment, and 4) a summary stage providing conclusions about statistical evidence for the sizes of possible causal effects of the exposure on outcomes.

We illustrate our approach using an example examining the effect of parental smoking on children's lung function collected in families living in East Boston in the 1970s. Our approach could be credibly applied to less than 20% of the children in the families but found a realistic and important decrease in mean FEV-1 among children with parents who smoked vs. parents who did not smoke.

To complement the traditional purely model-based approaches, our strategy, which includes outcome free matched-sampling, provides workable tools to quantify possible detrimental exposure effects on human health outcomes especially because it also includes transparent diagnostics to assess the assumptions of the four-stage statistical approach being applied.

CV

Dr. Marie-Abèle Bind is alumni of the CII's MS program in Environmental Health. She earned her joint Sc.D. degree in Environmental Health and Biostatistics at the Harvard School of Public Health. Subsequently, she worked as a postdoctoral Ziff Fellow at the Harvard University Center for the Environment with Prof. D. Rubin and estimated causal effects of extreme weather exposures on health under the Rubin Causal Model. Dr. Marie-Abèle Bind is a Research Associate in the Statistics Department at the Faculty of Arts and Sciences, Harvard University. Her research focuses on transporting classical experimental insights into the field of environmental epidemiology, as well as developing new causal inference methods to address causality when examining the effects of environmental exposures (e.g., air pollution and extreme weather) on health in complex settings (e.g., missing data and big data).