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Bipartite Causal Inference with Interference: Estimating Health Impacts of Power Plant Regulations

April 26, 2021

12 - 1 pm ET (US & Canada)

A fundamental feature of evaluating causal health effects of air quality regulations is that air pollution moves through space, rendering health outcomes at a particular population location dependent upon regulatory actions taken at multiple, possibly distant, pollution sources. Motivated by studies of the public-health impacts of power plant regulations in the U.S., this talk introduces the novel setting of bipartite causal inference with interference, which arises when 1) treatments are defined on observational units that are distinct from those at which outcomes are measured and 2) there is interference between units in the sense that outcomes for some units depend on the treatments assigned to many other units. Interference in this setting arises due to complex exposure patterns dictated by physical-chemical atmospheric processes of pollution transport, with intervention effects framed as propagating across a bipartite network of power plants and residential zip codes. New causal estimands are introduced for the bipartite setting, along with an estimation approach based on generalized propensity scores for treatments on a network. The new methods are deployed to estimate how emission-reduction technologies implemented at coal-fired power plants causally affect health outcomes among Medicare beneficiaries in the U.S.

Dr. Zigler is an associate professor in the Department of Statistics and Data Sciences (College of Natural Sciences) and in the Department of Women's Health (Dell Medical School). His research focuses on development of Bayesian methods for causal inference in complex observational studies. Specific areas of statistical methods development include methods for causal inference with interference, intermediate variables (mediation analysis, principal stratification), confounding in high dimensions, model uncertainty/model averaging, treatment effect heterogeneity, spatial statistics, missing data, environmental health data science, and tools for transparent/reproducible research.

Most of his research is motivated by problems in public health and epidemiology. Key areas of focus are evaluation of environmental health policies and comparative effectiveness of clinical therapies using large administrative data, but he has worked in a wide range of problems in public health and biomedical science.

Topic: EPH 581 01 (SP21): Seminar for Modeling in PH

Time: Apr 26, 2021 12:00 PM Eastern Time (US and Canada)

Join from PC, Mac, Linux, iOS or Android: <https://yale.zoom.us/j/97036857173>

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