

Course Title

Instrumental Variable Methods for Causal Inference with Applications to Mendelian Randomization

Category

methodology

Target Audience

graduate students, postdocs, junior faculty and all researchers in causal inference

Prerequisites for Participants

graduate level statistical inference courses completed

Computer and Software Requirements

R programming

Course Description**Abstract**

Unmeasured confounding is a significant problem when inferring causal relationships from observational data. Instrumental variable (IV) methods can obtain unconfounded causal effect estimates even in the presence of unmeasured confounding. IV methods were initially developed in econometrics and have been widely and successfully used in empirical economics and other social sciences. Recently, Mendelian randomisation (MR) methods have gained popularity in health studies partially because of the increasing availability of individual- and summary-level genetic data. MR uses genetic variants as instruments to assess the causal effects of modifiable risk factors on the health outcome of interest. In this course, we will discuss the most important existing IV methods for MR studies and their limitations. Future research directions will also be discussed. Computer code and numerical examples will be used to illustrate various IV methods. The goal of this short course is to summarise and introduce the recent developments of IV methods in the context of MR studies and motivate future method development in this field.