PROGRAM APH METHODOLOGY CAUSAL INFERENCE MASTERCLASS

APH ANNUAL MEETING November 23rd 2017

Time	Presenters	Title	Description
13:00 to 13:10	Dr. Mariska Leeflang and prof. dr. Hans Berkhof	**Welcome and introduction by program leaders**	
13:15 to 14:00	Dr. Thomas Klausch	**Causal inference with observational data:** *a tour from averages to personalization*	
		The first talk of this masterclass gives an introduction to the problem of inference about treatment effects using retrospective and observational data. In these settings confounded treatment assignment prohibits applying standard analysis techniques commonly used in experiments. We learn about the Rubin causal model (RCM) which formulates the causal inference problem as a missing data problem. Based on the RCM a wide range of techniques has been suggested to estimate average treatment effects (ATE) as well as so called average effects on the treated (ATT). We take a bird's eye view on these techniques including regression estimators and the class of propensity score techniques. It is explained that the common denominator of these techniques is an assumption called "unconfoundedness", and that in the absence of unconfoundedness the aforementioned techniques all give biased estimates. The major difference of the techniques is the path of inference, which either uses outcome models or treatment assignment models. The practicing methodologist, therefore, often has to choose techniques based on beliefs whether outcome or assignment can be modeled to higher accuracy. To conclude, we take a look at current developments in clinical causal research. In the presence of availability of large, sometimes called "big", data sets the interest now often concerns discovering treatment effect heterogeneity. Such endeavors will ultimately allow for stronger personalization of medical treatments.	
14:00 to 14:30	**Networking intermezzo with coffee and tea**		
14:30 to 15:15	Dr. Martijn Heijmans and drs. Judith Rijnhart	**Mediation analysis**	
		The focus of the second talk of this masterclass is on the application of mediation models for estimating causal relationships. We will pay attention to linear and logistic regression models including continuous and dichotomous mediator variables and how to handle these from frameworks as Structural Equation modeling and the Potential Outcomes framework. We will discuss different procedures to estimate the indirect mediation effect and will illustrate these procedures by using real-world examples from observational and randomized controlled trials. Future challenges in mediation analysis such as the need for longitudinal mediation models will also be discussed.	
15:15 to 15:55	Dr. Mariska Leeflang	**Causal inference in the context of diagnostic testing**	
		Diagnostic test accuracy is usually researched in a probabilistic framework: the predictive value or sensitivity and specificity of a test may be corrected for differences in setting or for who is tested, but the concept of confounding does not play a role. However, when answering the question which test has the highest accuracy, then a causal inference framework may become relevant. If test A was investigated in a different patient population than test B, then any differences between the two tests may be caused by population rather than test characteristics. This presentation explains why causal inference may have a place in (comparative) diagnostic test accuracy research and we will discuss the pitfalls when doing so.	
15:55 to 16:00	Dr. Mariska Leeflang and prof. dr. Hans Berkhof	**Closing by program leaders**	