

Practical on Directed Acyclic Graphs

PART 1

Based on Santos S, Zugna D, Pizzi C, Richiardi L. (2018) Sources of confounding in life course epidemiology. Journal of Developmental Origins of Health and Disease. page 1 of 7. doi: 10.1017/S2040174418000582

Draw a DAG depicting each of the following scenarios, and discuss on how to control for confounding/bias in each scenario.

1. In a study on exposure to antibiotics in infancy and asthma at school age, infant respiratory infections may induce exposure to antibiotics and may increase the risk of asthma later in life.
2. In a study on maternal use of antibiotics during pregnancy and asthma at school age, maternal respiratory tract infections during pregnancy could act as confounders by indication, as maternal respiratory infections induce the use of antibiotics and may be associated with the risk of child asthma, assuming that an increased maternal susceptibility to respiratory infections is associated with a similar child increased susceptibility to respiratory diseases (including asthma).
3. In a study on the use of antibiotics in childhood and a child disease, early manifestations of the disease induce the use of antibiotics.
4. In a cohort study, based on volunteers, that aims to evaluate the effect of maternal use of antidepressants during pregnancy on child neurodevelopment, both use of antidepressants and smoking during pregnancy – a risk factor for child neurodevelopment – are likely to decrease the probability of volunteering into the study.
5. In a randomized controlled trial on aspirin intake vs. bed rest to reduce discomfort due to acute headache, patients' knowledge of treatment assignment may affect the reported discomfort.

PART 2

Based on: Ian Shrier and Robert W Platt Reducing bias through directed acyclic graphs, BMC Medical Research Methodology 2008, 8:70.

The Figure represents the causal diagram for the relation between warming up prior to exercise and the outcome injury.

1. Identify at least 3 open and 3 blocked backdoor paths from warm-up exercise and injury.
2. What would be the simplest way to estimate the causal effect of warm-up exercise to injury?

