Good and bad controls

Good controls

- Block non-causal paths
- Improve precision
- Allow inference of causal effects

Bad controls

- Block causal paths (blocking pipes)
- Open non-causal paths (opening colliders)
- Reduce precision
- Prevents causal inference

Cinelli, C., Forney, A. & Pearl, J. A crash course in good and bad controls. (2020) doi:10.2139/ssrn.3689437

Summary

- The only way to answer causal questions about our systems is to think about them scientifically
- Statistics can not differentiate between causal and non-causal associations (we are only measuring differences)
- Model comparison, significance, and other statistical tools are useful, but can't replace scientific reasoning

- Use DAGs liberally to think about the causal relations you are attempting to measure
- Use the **back-door criteria** to decide which variables should be included a model, depending on the question you are trying to answer:
  - Which effect do you want to estimate?
  - **Different estimates** of interest might require **different models**