Confounding

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- in a homogeneous population of patients we can think of treatment assignment as random ⇒ ignorability assumption would hold

Confounders are variables X_i that affect both, treatment and outcome

↳ e.g. non-confounder examples:
- if we flip a coin to choose treatment A, then only treatment is affected by the coin flip, it doesn't affect (directly) the outcome (⇒ the coin (flip) is not a confounder).
- if people w/ family history of cancer are more likely to develop cancer (outcome), but family history was not a factor in the treatment decision, then family history is not a confounder.

↳ a variable that only affects the outcome is also called: risk-factor (predictor)

Confounder example:

- old people @ higher risk of cardiov. disease (outcome) & old people are more likely to receive statins (treatment), then age is a confounder variable

Confounder control: we need to

1) identify a set of variables X that make the ignorability assumption valid.
   ↳ if we do this, then X is sufficient (i.e. X is sufficient to control for confounding)
2) use stats. methods to control for the confounding variables and to estimate causal effects of the treatment.

⇒ GOAL: find set of variables X that will achieve ignorability (i.e. $\{Y^a\} \perp\!\!\!\perp T \mid X \ (\forall a)$)

↳ X is a set that is sufficient to control for confounding.