Causation and RCTs

Randomized controlled trials

RCTs are the stereotypical experimental trial

Treatment group gets treatment

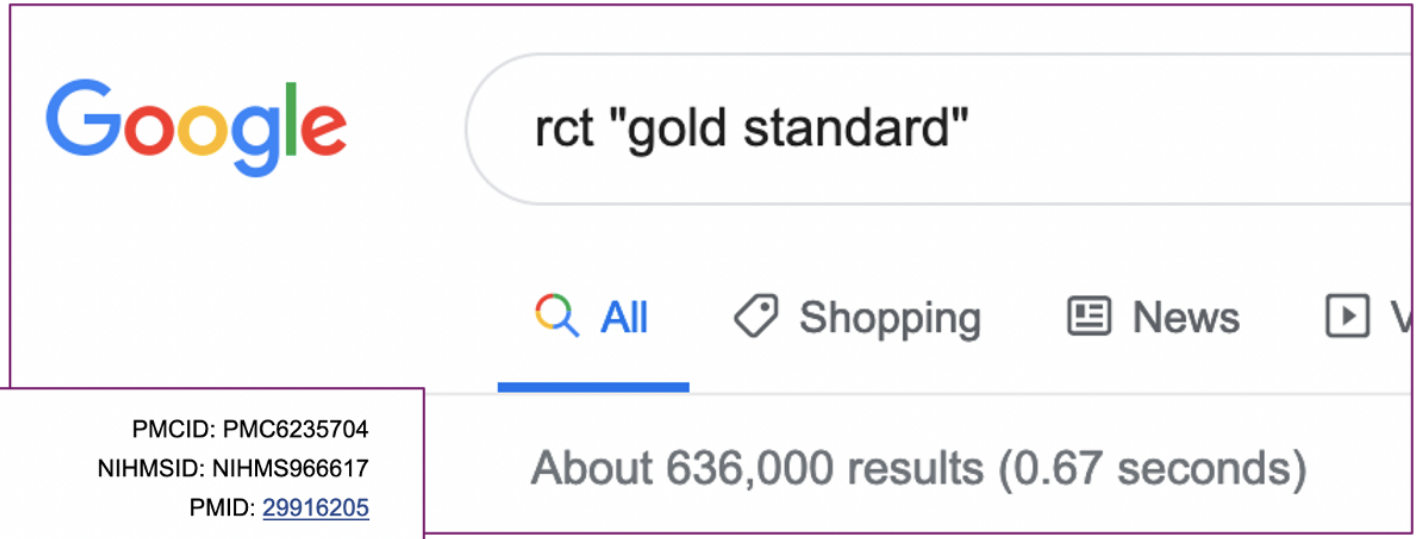
Control group does not

Average outcome in treatment group – average outcome in control group = causal effect of program

The magic of randomization

Randomization makes it so that people don't self-select into the treatment

Randomization also makes it so that differences in pre-treatment characteristics don't really matter



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Randomised controlled trials—the gold standard for effectiveness research

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Randomized Assignment of Treatment

When a program is assigned at random—that is, using a lottery—over a large eligible population, we can generate a robust estimate of the counterfactual. *Randomized assignment* of treatment is considered the gold standard of impact evaluation. It uses a random process, or chance, to decide who is granted access to the program and who is not.[1] Under randomized assign-
ment, every eligible unit (for example, an individual, household, business,

The "gold" standard

Some believe RCTs
are the *only* way to find causation

You'll see this in the comment sections for articles about COVID-19!

The "gold" standard

Saying RCTs are the "gold standard" implies that all causal inferences will be valid if you do the experiment right

That's not the case! We don't care if studies are experimental!

We care if our causal inferences are valid

When to not randomly assign

You can't RCT everything!

Don't use RCTs...

...when you need immediate results

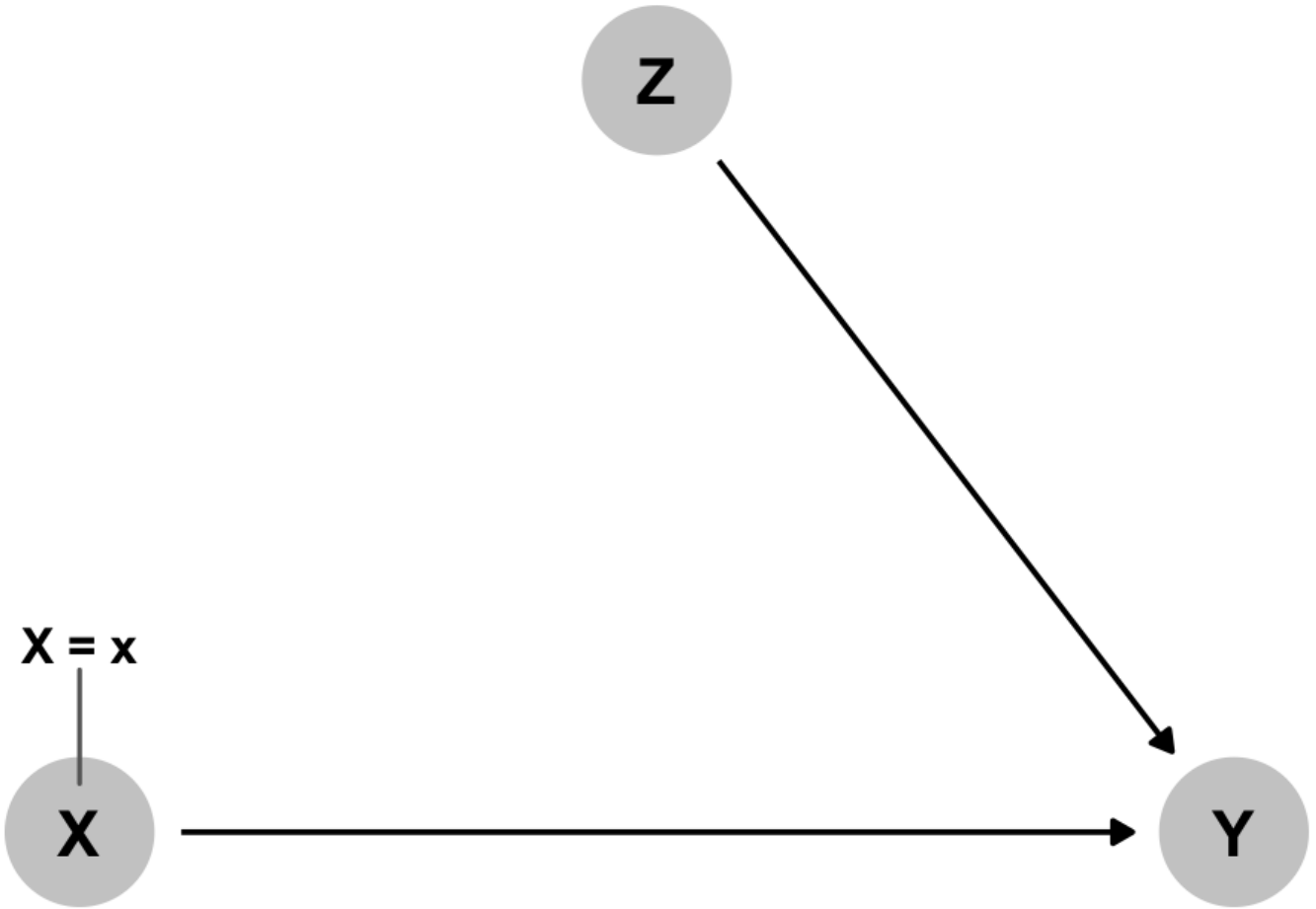
...when it's unethical or illegal

RCTs and DAGs

RCTs intervene in a DAG

Delete all arrows pointing into the treatment node

No more confounders and backdoors!



How to analyze RCTs

1. Check the balance between the treatment and control groups

2. Estimate the difference in outcome between the groups

Our turn

Let's analyze an RCT with R!

Next up

Closing backdoors with regression