CMED 305

Cross-Sectional Studies

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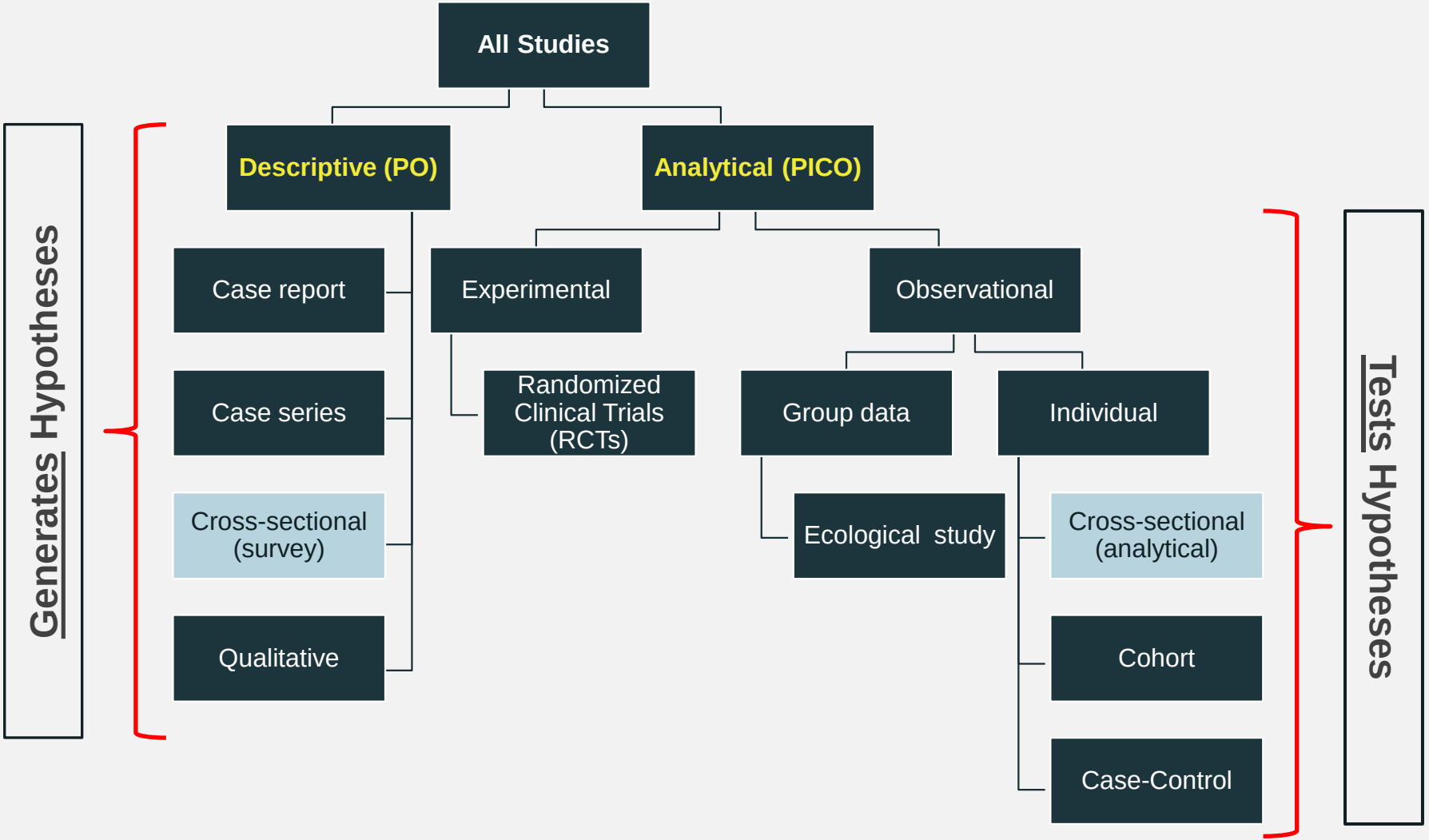
Learning Objectives: By end of this session students will be able to:

1. Describe types of cross-sectional studies
2. Identify steps for conducting cross-sectional studies
3. Identify issues in the design of cross-sectional studies
4. Describe the strengths and weaknesses of cross-sectional studies

1 Types of cross-sectional studies


All Studies
Descriptive (PO)
Analytical (PICO)
Case report
Case series
Cross-sectional (survey)
Qualitative
Experimental
Randomized Clinical Trials (RCTs)
Observational
Group data
Individual
Ecological study
Cross-sectional (analytical)
Cohort
Case-Control
Generates Hypotheses
Tests Hypotheses

A cross-sectional study is a study that quantifies an outcome of interest **AND/OR** examines the relationship between disease (or other health related state) and other variables of interest as they exist in a defined population **at a single point in time**.

Types of Cross-Sectional Studies

Descriptive

Study **prevalence** of health related events at a point in time/snapshot

(e.g. diseases, risk factors, interventions, health service utilization, knowledge, attitudes and practice)

Analytical

Assess **association** between exposure and outcome.

Exposure and disease status are assessed **simultaneously** among individuals at the same point in time

Compare prevalence of disease in persons with and without the exposure of interest

When to Conduct a Cross- Sectional Study

- To estimate **prevalence** of a **health condition** or **prevalence** of a behavior or **risk factor**
- To learn about **characteristics** such as knowledge, attitude and practices of individuals in a population
- To **monitor trends over time** with serial cross-sectional studies (e.g. in the US the National Health and Nutrition Surveys (**NHANES**)).

{2 How to conduct a cross-sectional study?}

Steps in conducting a cross-sectional study

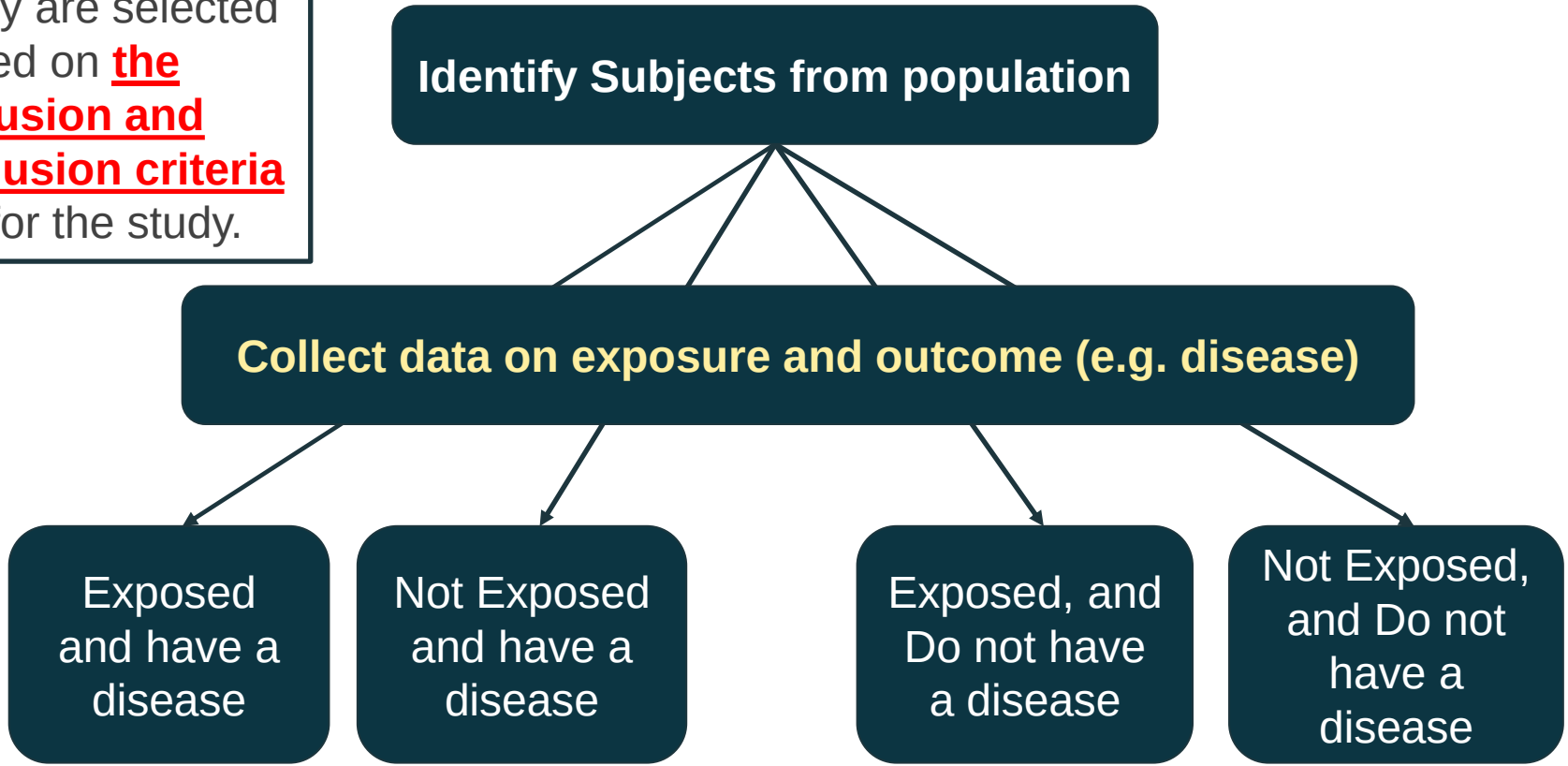
1- Define a **population** of interest (reference or source population)

2- Recruit a representative **sample** (adequate size, random selection)

3- Measure the **variables** of interest (exposure/outcome) at the same point in time

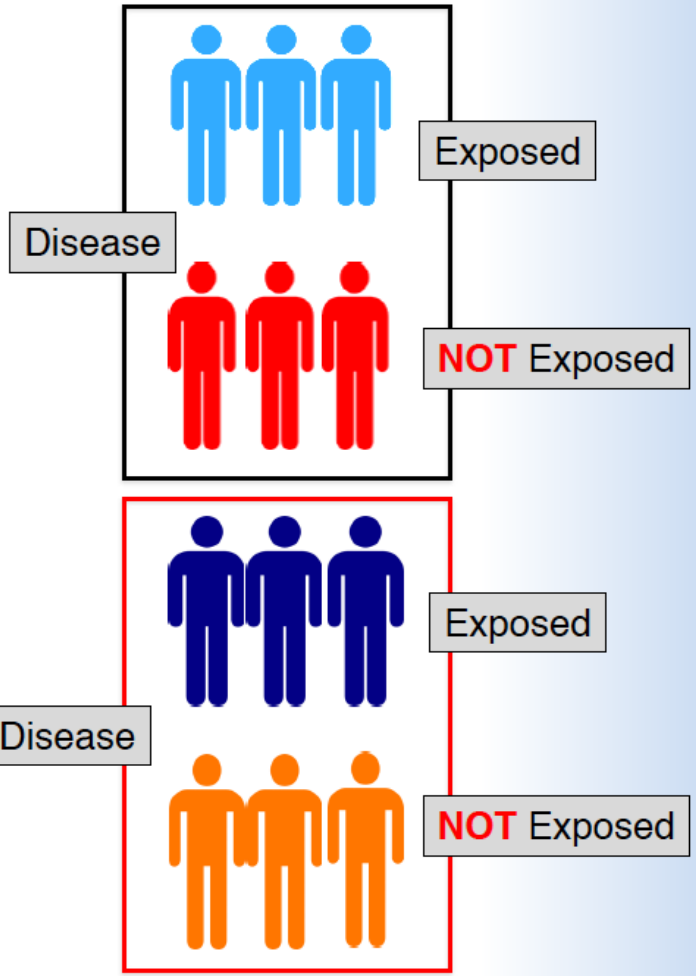
4- Analyze the **data**

The participants in a cross-sectional study are selected based on **the inclusion and exclusion criteria** set for the study.

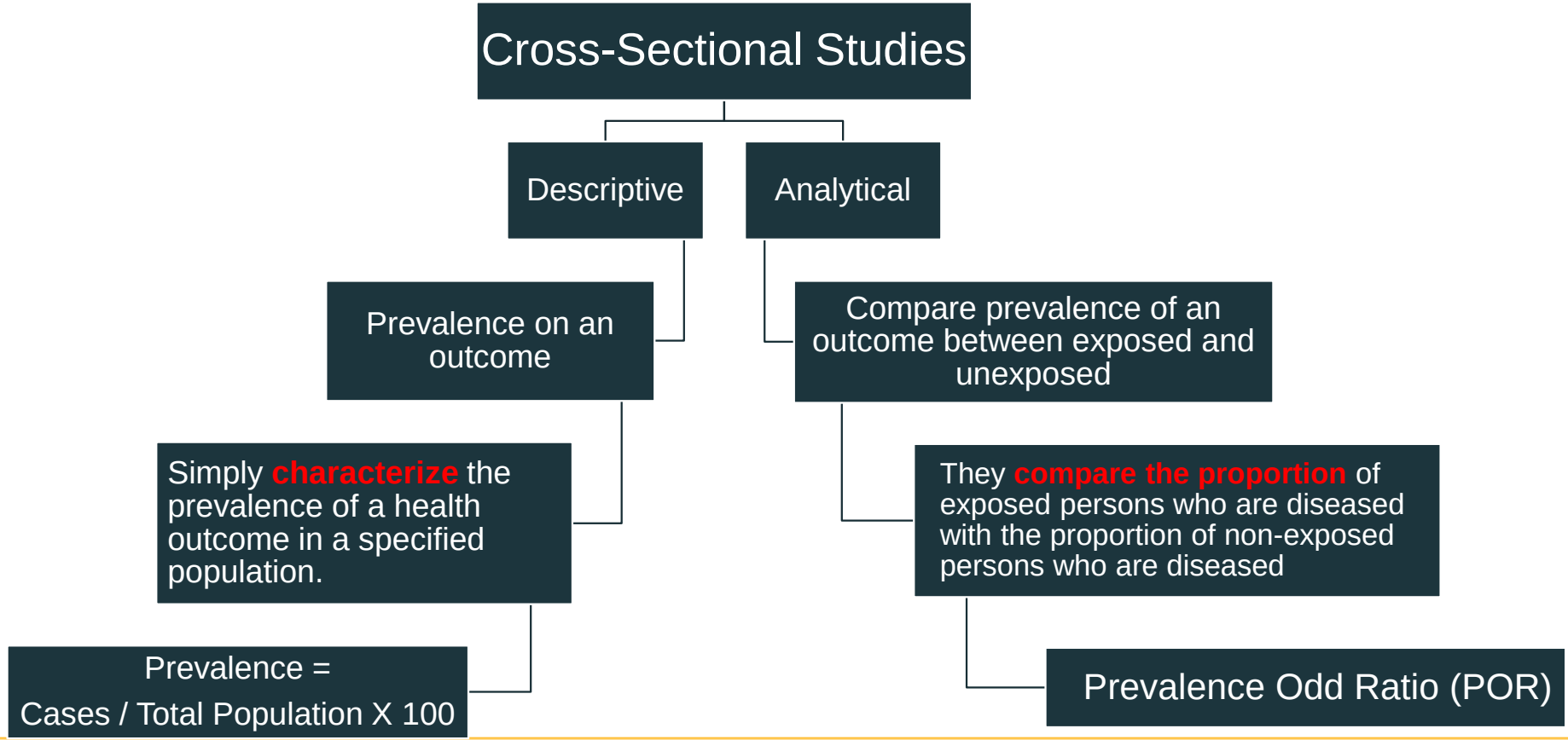


Measure disease and exposure status simultaneously among individuals in a well-defined population at a point in time.
(Snapshot of the health status of populations at a certain point in time)

Study Population



Measurement & Analysis in Cross-Sectional studies



Calculating measures of disease prevalence and measures of associations

Vaping and Advertisement

You identify a random sample of young adults aged 18 – 25 in city of Riyadh.

Exposure: Ads about vaping **Outcome:** Vaping

	Vaping	**Not Vaping**	**Total**
Ads	50	200	250
No Ads	50	700	750
Total	100	900	1000

	Vaping	Not Vaping	Total
Ads	50	200	250
No Ads	50	700	750
Total	100	900	1000

Descriptive Cross-Sectional:

What is the prevalence of vaping?

Number of people who vape/ Total population X 100

= 100 /1000 X 100

= 10%

	Vaping	Not Vaping	Total
Ads	50 **a**	200 **b**	250
No Ads	50 **c**	700 **d**	750
Total	100	900	1000

Analytical Cross-Sectional:

Does the prevalence of vaping vary by the status of exposure to advertisement?

i.e. What are the odds of vaping given exposure to advertisement?

POR = odds an exposed person develop the outcome (a/b)
odds an unexposed person develop the outcome (c/d)

= **ad / bc**

= (50X700) / (200X50) = 3.5

What does a POR of 3.5 mean?

The odds of vaping is 3.5 times higher among those who have seen a vaping advertisement compared to those who haven’t.

{3 Issues in the design of cross-sectional studies }

Study sample

1. should be representative of the population.
2. should be large enough to estimate prevalence of the conditions of interest with adequate precision

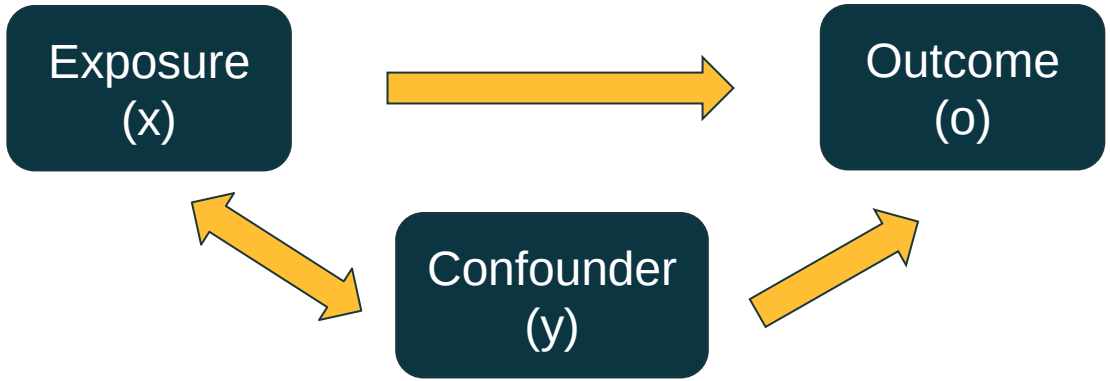
Biases in Cross-Sectional Studies

Bias may be defined as any systematic difference between groups in an epidemiological study that results in an incorrect estimate of the true effect of an exposure on the outcome of interest.

1. Selection Bias (sampling bias)
2. Recall bias

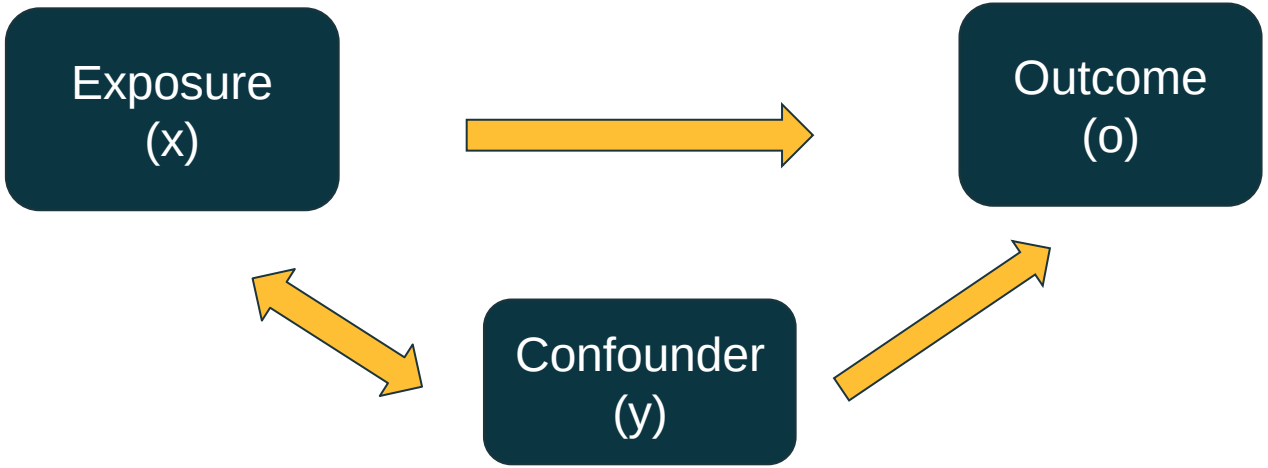
Confounding

Occurs when an observed association is in fact distorted because the exposure (x) is correlated with another risk factor(y) which is also associated with the outcome (o).



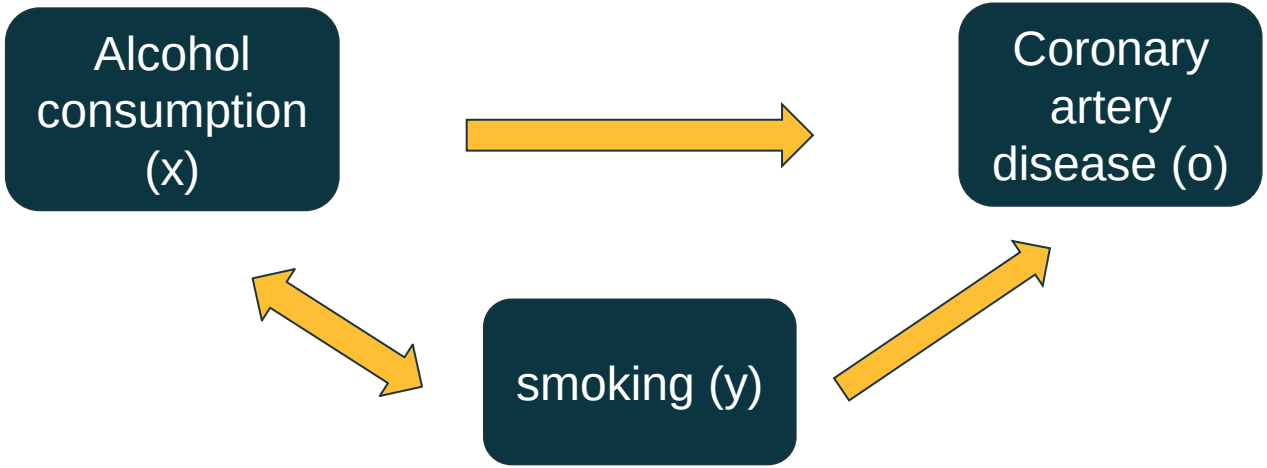
Confounding

1. Associated with exposure
2. Causing the outcome
3. Does not lie in the causal pathway



Confounding

1. Associated with both exposure
2. Causing the outcome
3. Should not lie in the causal pathway



{4 Strengths & Weaknesses }

Strengths

- Relatively quick and easy to conduct
- Multiple outcomes and exposures can be studied.
- Data on all variables is only collected once
- Able to measure prevalence for all factors under investigation
- Good for describing and for generating hypotheses.

Weakness

- Difficult to determine temporality between exposure and outcome
- Associations identified may be difficult to interpret.
- Susceptible to bias due to low response and misclassification due to recall bias.

Thank you!

Office Hours (by appointment via email):

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References:

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