Quality of Comparison

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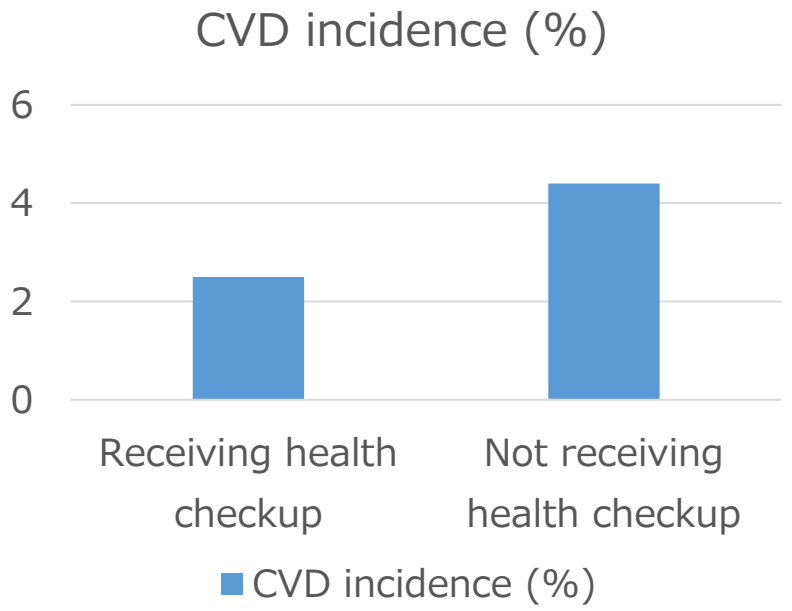
Can you distinguish confounding from bias?

Today's topic

1. What is the quality of comparison?
2. Three factors that decrease the quality of comparison
3. How to identify confounding factors

What is a high-quality comparison?

"Participants receiving health checkup had lower incidence of cardiovascular, compared with those not receiving health checkup."



1. The results are not due to chance →**random error**
2. Measured data is accurate→**bias**
3. No 3rd factors affect the comparison→**confounding**

The results are not due to chance

- What additional information is needed to distinguish non-coincidence from coincidence?

  Risk ratio 2.0

- How to show variation of risk ratio

  Confidence interval 1.2–3.2

Biases (other than confounding)

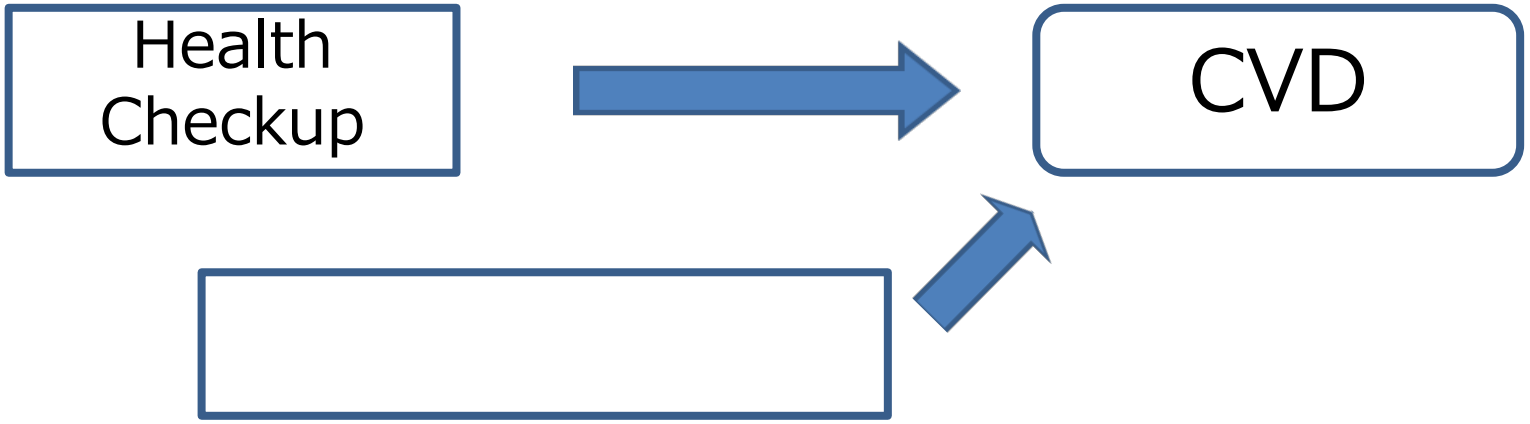
- Measured data is inaccurate

- Keep in mind the following 2 points
  - Selecting participants = selection bias
    - Evaluating athletic ability in sports scholarship students
  - Measuring outcome/exposure = information bias
    - Having to give karaoke scores in front of the singer (scary boss)

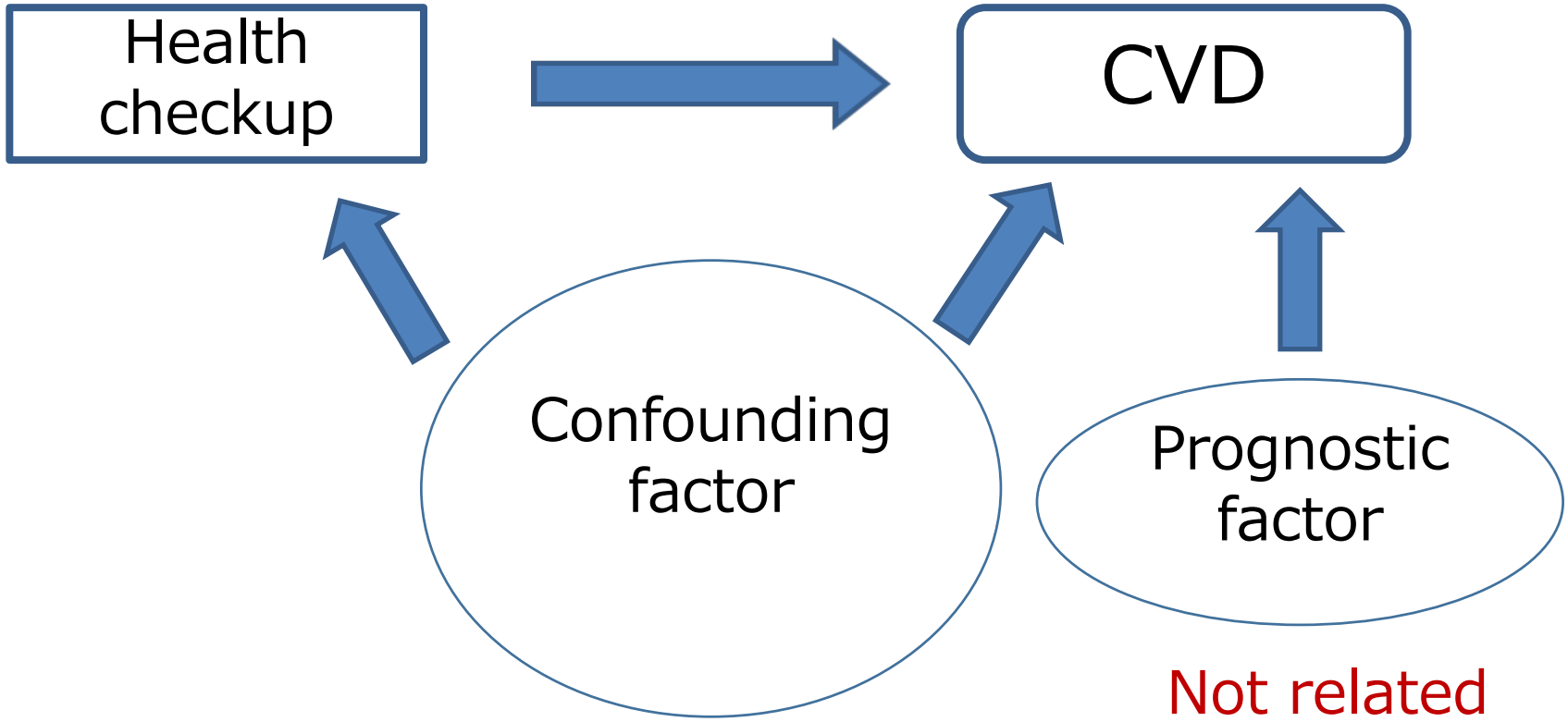
How to identify a confounding factor

A. Connect exposure and outcome with an arrow

B. List prognostic factors that affect the outcome

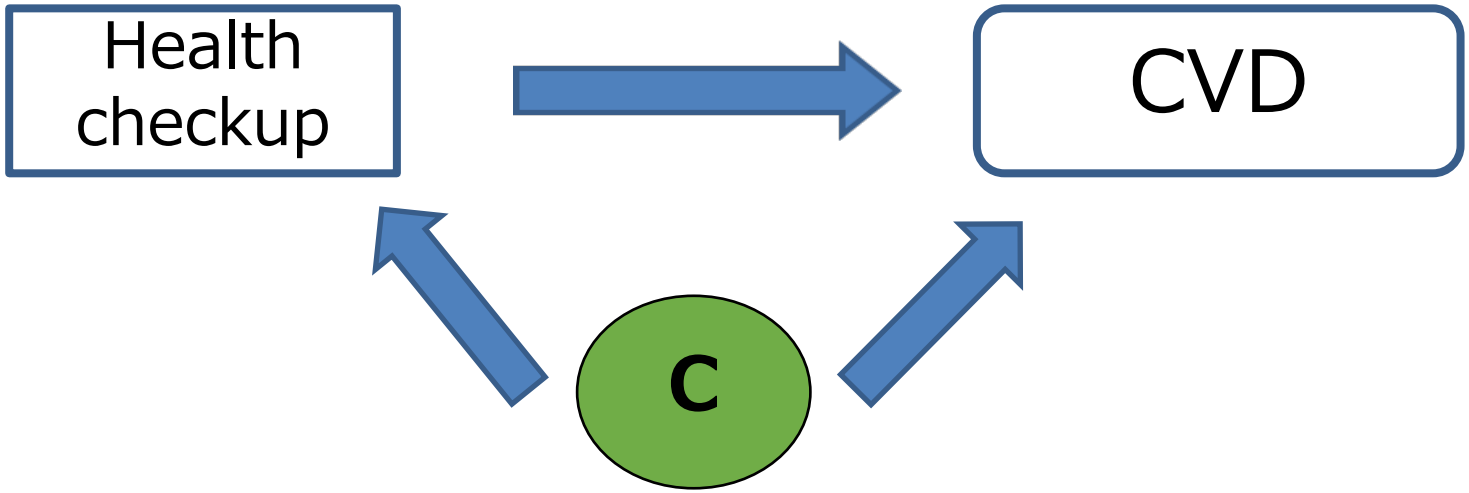


Distinguish confounding factors from prognostic factors



Check the three criteria of a confounding factor

1. (3rd factor) affects (Outcome CVD)
2. (3rd factor) is related to (Exposure Health Checkup)
3. (3rd factor) is not a result of (Exposure Health Checkup)



How to identify confounding factors (summary)

1. List 3rd factors (prognostic factors) that affect the outcome based on previous studies and medical knowledge
2. Of the factors listed in 1, those that have a different distribution in the exposed and the control groups are considered as potential confounding factors
3. Make sure that a potential confounding factor is not a result of exposure
4. Among multiple confounding factors, give priority to measurable factors

Confounding and Bias

- Confounding
  - Measured data is accurate.
    - Scale is Not broken down.
    - Confounding factor affect the comparison.

- Bias
  - Measured data is inaccurate.
    - Scale is broken down.
    - We have to fix the scale and re-measure it.

We can adjust for confounding factors.

But, we can’t adjust for bias after measurement.

Confounding and Bias

	Confounding	Bias
Mechanism	**Confounding factor (3rd factor) affect the comparison**	**Measurement or patient selection is inaccurate**
Measured-data	accurate	inaccurate
Result of comparison	inaccurate	sometimes inaccurate
Plan	・remove confounding factors before measurement ・adjust for confounding after measurement	・prevention before measurement

Main points of today's lecture

1. Three factors that decrease the quality of comparison
   - Coincidence: random error
   - Inaccuracy of measured data: biases other than confounding
   - Adverse influence on comparison: confounding
2. Confounding and Bias
3. How to identify confounding factors