

# Case Control Studies

## Overview

- Retrospective
- Observational study
- Identify cases (with known outcome / disease)
- Identify controls (similar to cases but don't have the outcome / disease)
- Collect information about history of exposures
- Compare the two groups with regards to the odds of each exposure

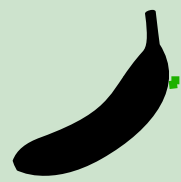
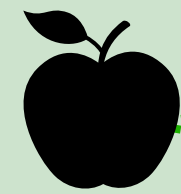
## Strengths

- Quick
- Cheap
- Can consider rare diseases
- Can consider multiple exposures

## Weaknesses

- Not considered to be a strong form of evidence
- Not great for considering rare exposures

## Exposures



## Outcomes

### Cases



Have  
disease

### Controls



No  
disease

Past ← Retrospective → Present

Greg Martin's study design cheat sheet  
For research methods teaching  
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# Cohort Studies

## Overview

- Prospective
- Observational study
- Identify specific exposure of interest (can be rare)
- identify a cohort within which you can distinguish between those exposed and those not exposed
- Follow over time
- Compare with regard to multiple possible outcomes

## Strengths

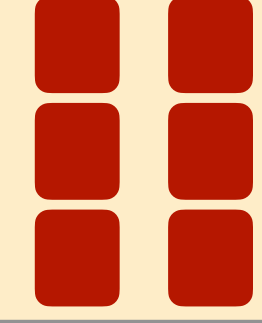
- Strong form of evidence
- Can consider rare exposures
- Can consider multiple outcomes

## Weaknesses

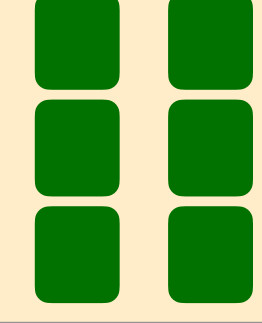
- Expensive
- Takes a long time to undertake study

## Cohort

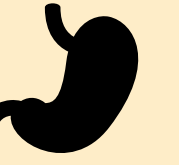
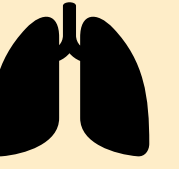
### Exposed



### Not exposed



## Outcomes



Present → Prospective → future

# Randomised Control Trial

## Overview

- Prospective
- Interventional study
- Participants are randomly allocated into either a treatment (intervention) or placebo (non-intervention) arm of the study. Groups followed up over time
- Comparison of the groups with regards to predefined end points is done in the analysis

## Strengths

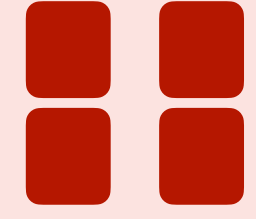
- Very strong form of evidence
- Random allocation means that other than the intervention itself, there should be no systematic differences between the two groups and therefore no confounding variables that need to be controlled for. I.e. RCTs control for known and unknown confounding factors

## Weaknesses

- Expensive
- Takes a long time to undertake study

## Groups

### Intervention

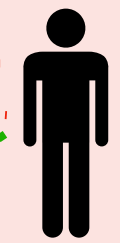


Random  
allocation  
into groups

### Placebo



## Outcomes



Present → Prospective → future

# Ecological Studies

## Overview

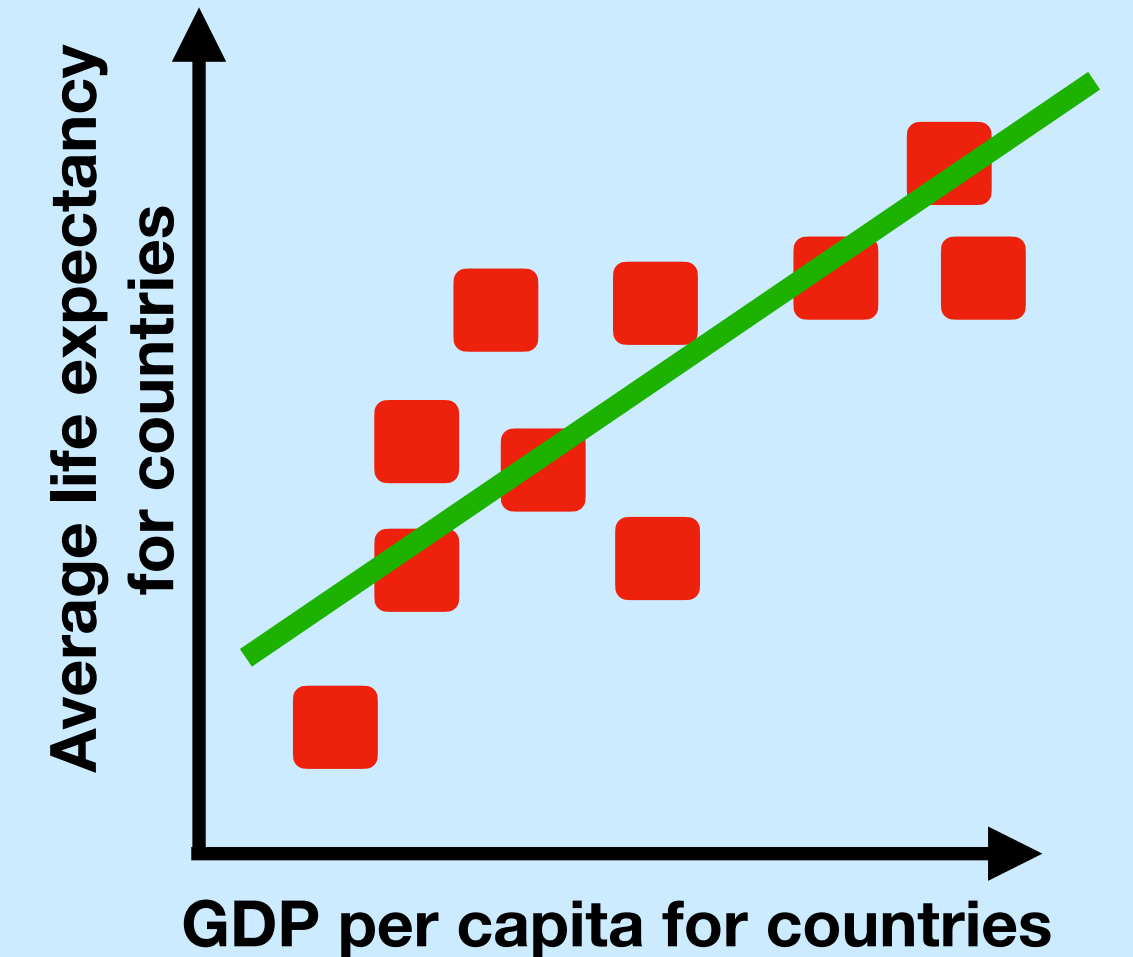
- Observational study
- The unit of observation is a group (population or community) instead of an individual

## Strengths

- Sometimes it is the only way to address a particular research question
- Good for hypothesis generation
- Usually quick (if secondary data analysis is possible)
- Usually cheap (where secondary data is available)

## Weaknesses

- The profile of the groups may be different (e.g. age and exposure to risks) making the interpretation of comparisons difficult
- Ecological fallacy: If inference about individuals are incorrectly made based observations at a group level, we call this error in logic, "ecological fallacy"



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