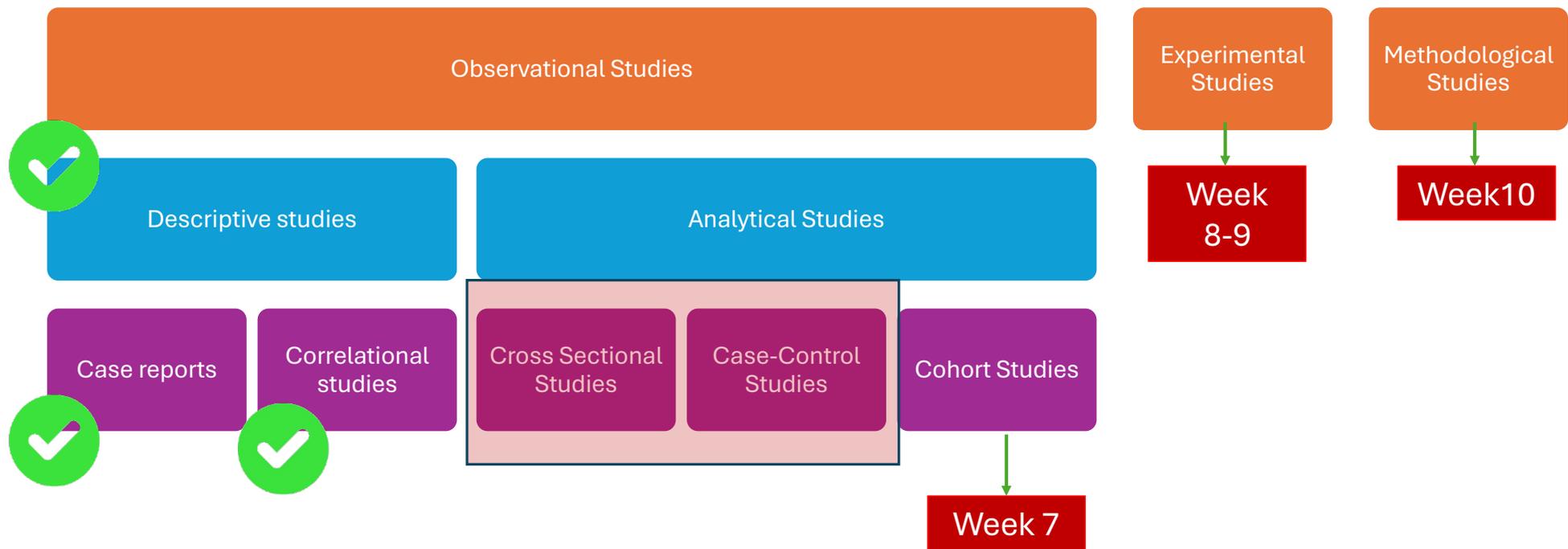


Week 7

Research Designs: Analytical Studies

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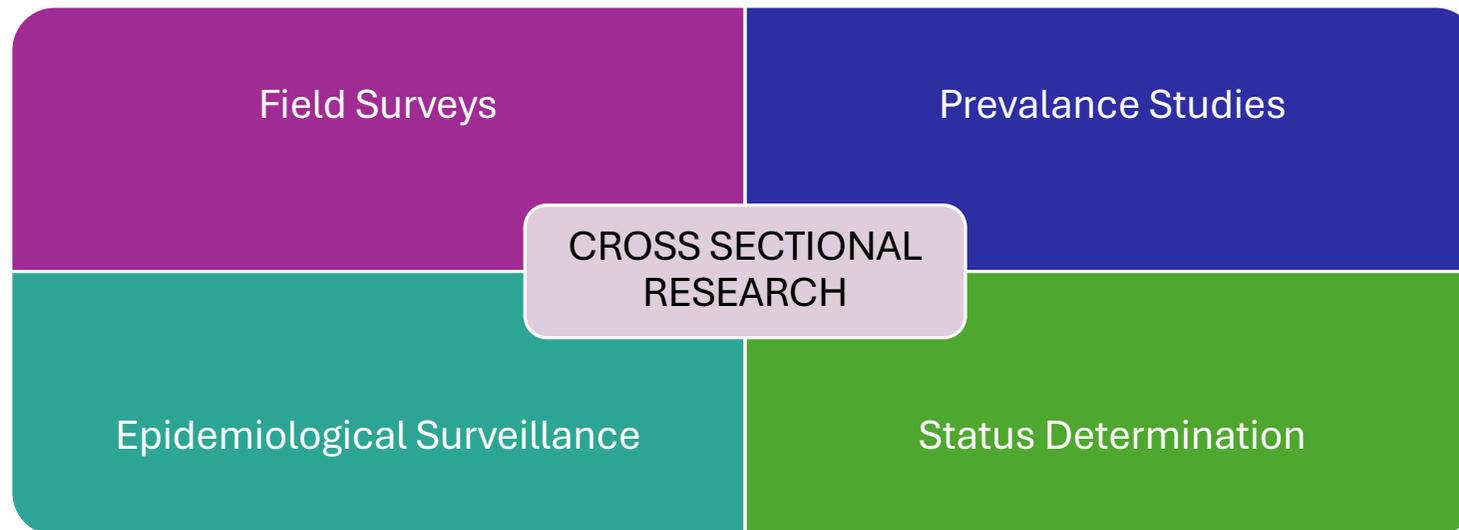
Research Designs



Observational Studies

Analytical Studies:

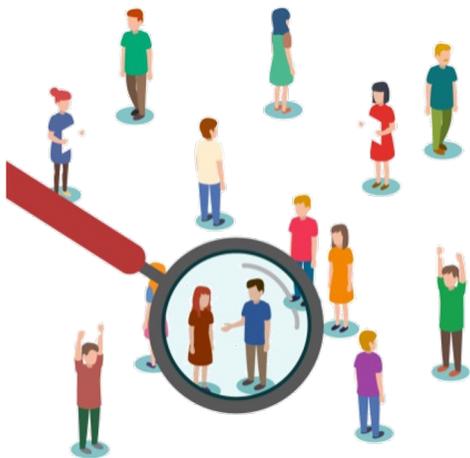
Cross-sectional studies



Observational Studies

Analytical Studies:

Cross-sectional studies



- ✓ Cross-sectional studies can be thought of as providing a “snapshot” of the frequency and characteristics of a disease in a population at a particular point in time.
- ✓ The frequency (prevalence) of the disease or event in a certain time period is determined in the whole population at risk or in a sample selected from this population.
- ✓ Because of these features, cross-sectional studies are also included in descriptive studies.
- ✓ Cross-sectional studies investigate the current situation by analyzing the data collected simultaneously from the selected sample without a certain time period. Collecting the subjects and obtaining the data is in a short time.

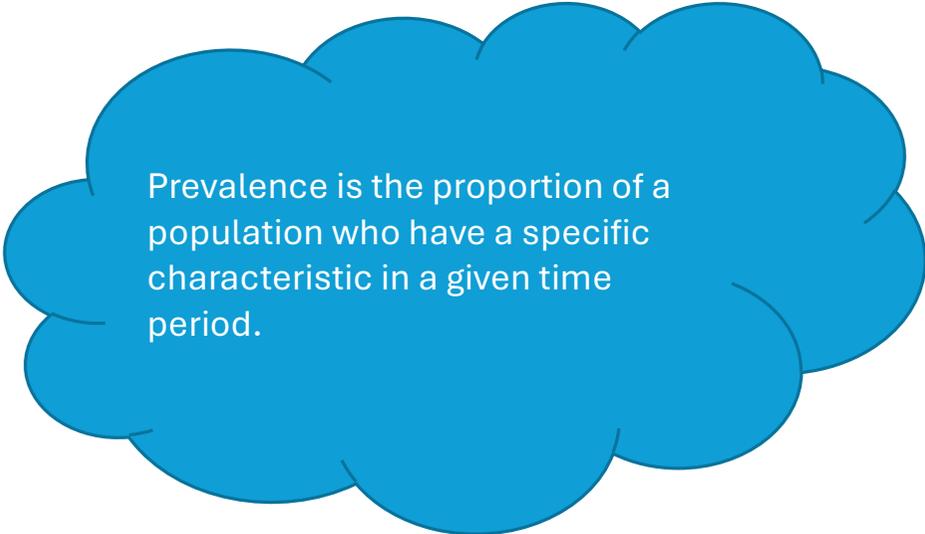
Observational Studies

Analytical Studies:

Cross-sectional studies

Measurement calculated in cross-sectional studies:

Prevalance



Prevalance is the proportion of a population who have a specific characteristic in a given time period.

Observational Studies

Analytical Studies:

Cross-sectional studies

Research steps in Cross sectional studies

Carried out in the population to be examined or in a representative sample with an appropriate sampling method.

The prevalence of the disease is determined in people who encounter and do not encounter the suspected "causal" factor.

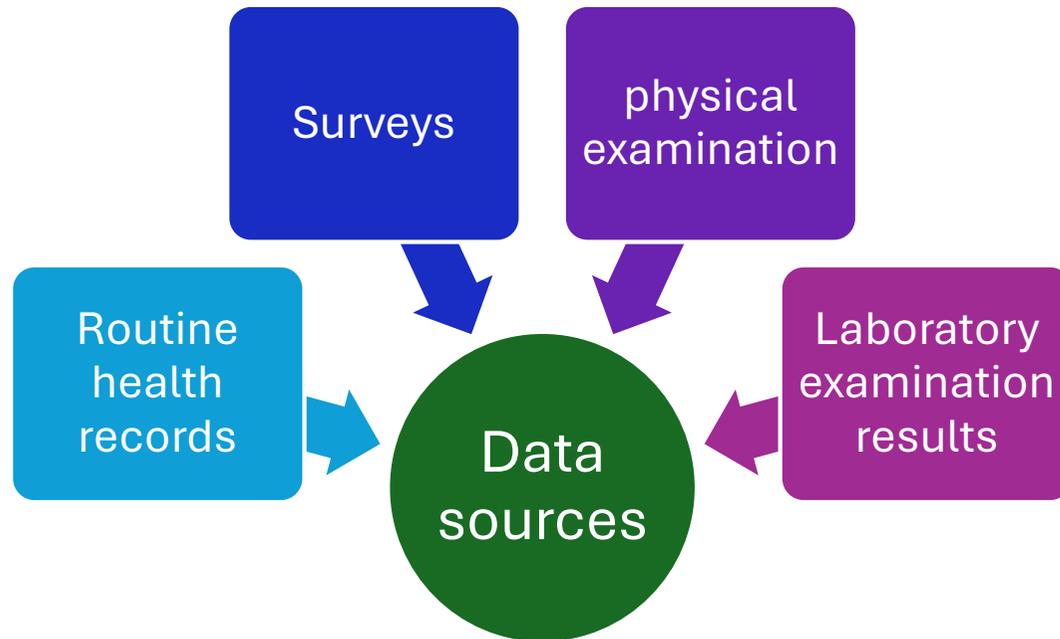
No need to choose a control group

Allows hypotheses to be developed for more detailed causal research

Observational Studies

Analytical Studies:

Cross-sectional studies



Observational Studies

Analytical Studies:

Cross-sectional studies

- ✓ If the population is not very large and the possibilities are sufficient, the entire population is included in the research.
- ✓ If the population is large, a representative sample is chosen.
- ✓ When studying in a sample, participation of all individuals in the research should be ensured.
- ✓ If the sample is not selected, the participation target should be at least 70-80%.
- ✓ Repeated cross-sectional studies can be used to examine disease trends and identify risk factors that emerge over time.

Observational Studies

Analytical Studies:

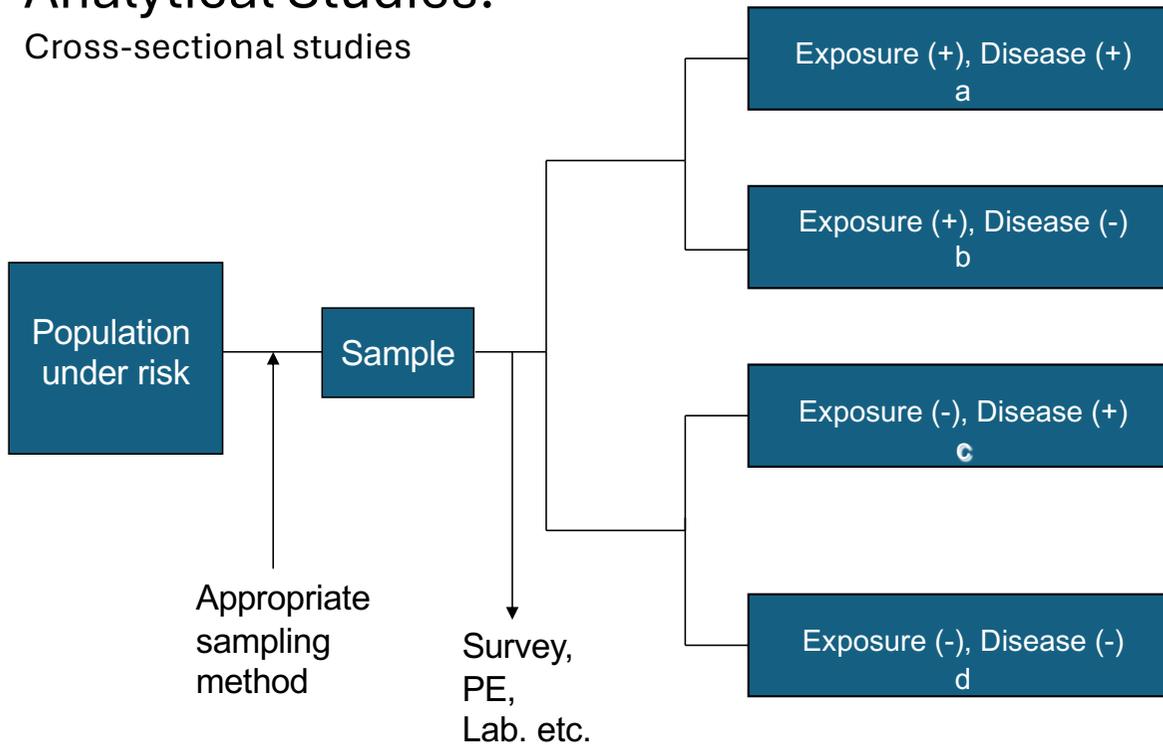
Cross-sectional studies

- ✓The relationship of frequency (prevalence) with socio-demographic characteristics and various etiological factors can be examined.
- ✓They are less reliable in demonstrating a causal relationship, since it is usually not possible to demonstrate a temporal relationship (cause and effect are examined simultaneously).
- ✓Case-control or cohort studies are needed to demonstrate causal relationship
- ✓The probability of healthy people encountering the disease, namely the incidence, can not be determined by this research design.

Observational Studies

Analytical Studies:

Cross-sectional studies



Risk Factor	Disease	
	Disease (+)	Disease (-)
Exposure (+)	a	b
Exposure (-)	c	d

$$\text{Total Prevalance} = \frac{a+c}{a+b+c+d} \times 100$$

$$\text{Prevalance (Exposure (+))} = \frac{a}{a+b} \times 100$$

$$\text{Prevalance (Exposure (-))} = \frac{c}{c+d} \times 100$$

Observational Studies

Analytical Studies:

Cross-sectional studies



PROS

- ✓ Suitable for communities without regular registration and disease reporting systems
- ✓ Usually applicable in a short time
- ✓ low cost
- ✓ Multiple health issues can be investigated
- ✓ The results obtained can be generalized to society or study population

CONS

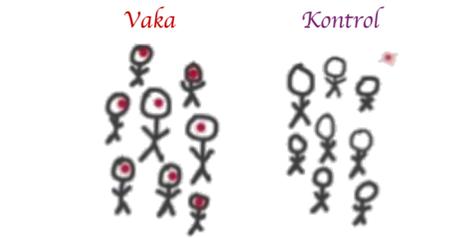


- Validity of the results is dependent on whether the study sample is well representative of the population.
- If records are used, insufficient records are an important problem.
- NOT SUITABLE for diseases with high fatality, rare or short-lived recovery,
- The cause-effect relationship cannot be strongly demonstrated because it is carried out only at a particular moment or time period.
- It may not be known whether exposure is prior to disease development (temporal relationship)

Observational Studies

Analytical Studies:

Case-Control Studies

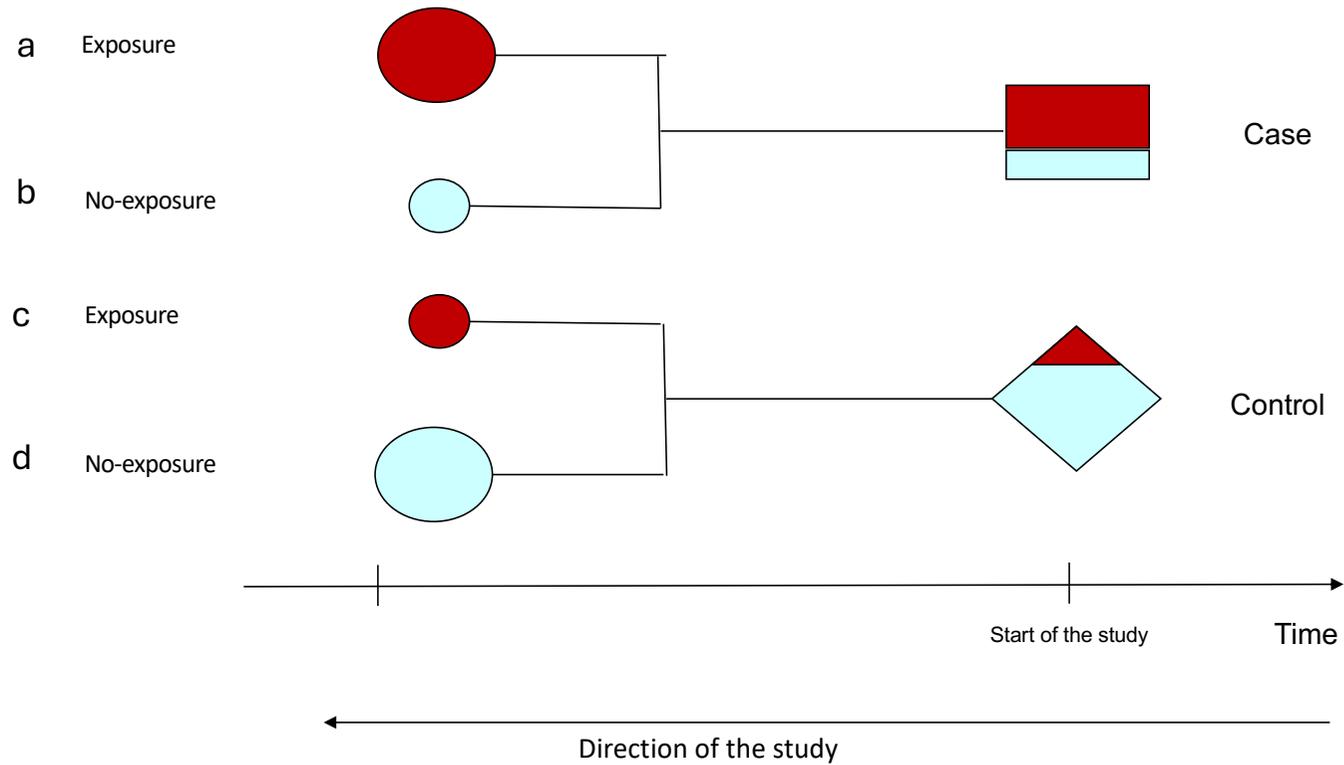


- In case-control studies, the aim is to compare a disease or case (group of patients) with a group without the disease or case (control group).
- Such studies answer the question of "what happened" and are also called retrospective studies.
- The analysis of case-control studies is basically based on finding the rate of the causative agent in the case and controls, and investigating the relationship between the disease and the agent by comparing these two ratios statistically.

Observational Studies

Analytical Studies:

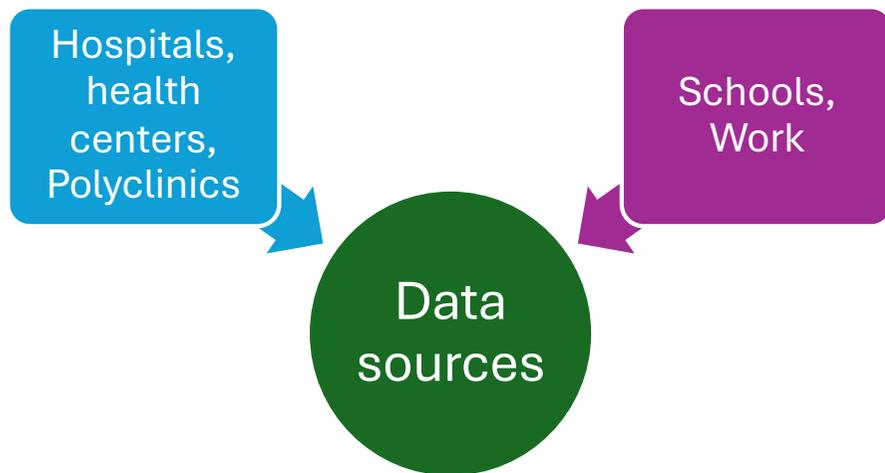
Case-Control Studies



Observational Studies

Analytical Studies:

Case-Control Studies



Controls should come from the same population as the cases, and their selection should be independent of the exposures of interest

Observational Studies

Analytical Studies:

Case-Control Studies

Exposure	Case	Control
(+)	a	c
(-)	b	d
Total	a+b	c+d

Measure of association

- ODDS RATIO (OR)

$$\text{Odds of an exposure in cases} = \frac{a}{b}$$

$$\text{Odds of an exposure in controls} = \frac{c}{d}$$

$$\text{Odds Ratio} = \frac{a/b}{c/d} = \frac{ad}{bc}$$

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Observational Studies

Analytical Studies:

Case-Control Studies

Information about ODDS RATIO (OR)



Due to the odds ratio (OR) formula, it cannot be negative and can be a value between 0 and infinity.

- ✓ When $OR = 1$, it can be said that the factor of interest (according to the reference) has no effect on increasing or decreasing the probability of the investigated situation.
- ✓ When $OR < 1$, the factor of interest (by reference) has a reducing effect on the probability of the condition being investigated.
- ✓ When $OR > 1$, the factor of interest (by reference) has an effect that increases the probability of the situation being investigated.

Observational Studies

Analytical Studies:

Case-Control Studies



PROS

- Preferred in studying rare outcomes
- Quick, inexpensive, easy
- Can work in small groups
- It is important that it can be repeated in different groups.
- You can use the records
- No problem leaving research



CONS

- Results cannot be generalized to the population
- Actual measures of morbidity cannot be obtained
- May prove an association but they do not demonstrate causation
- It can be difficult to find a suitable control group