

Week 8

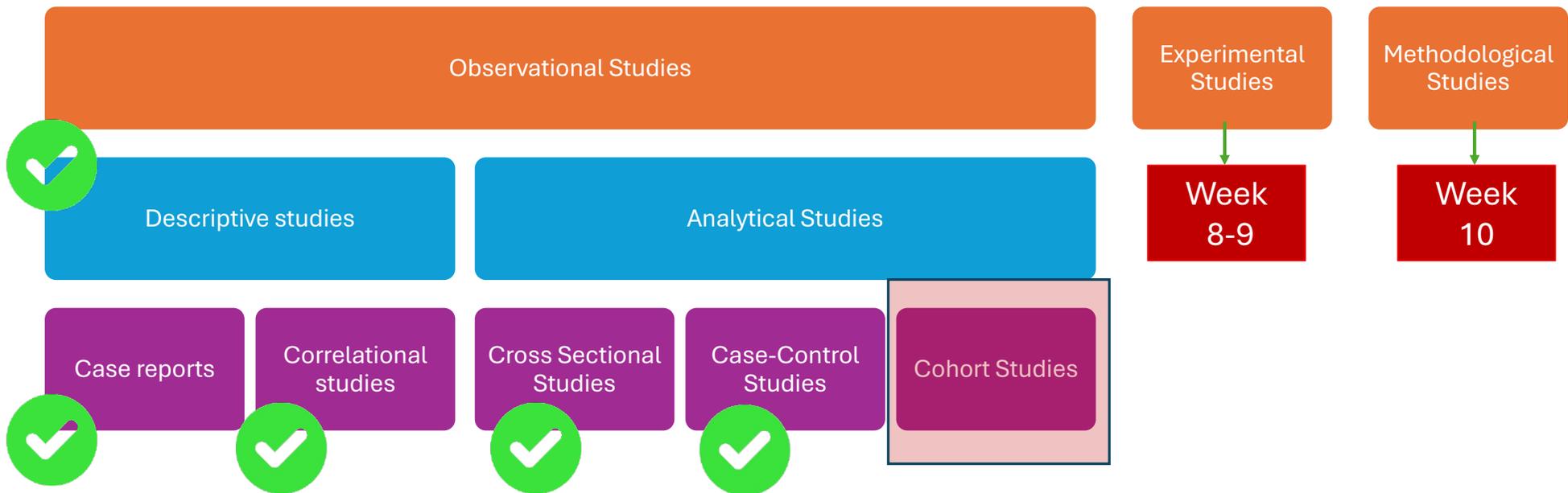
# Research Designs

## Analytical Study Designs

### Cohort Studies

Assoc. Prof. Dr. Dođukan ÖZEN

# Research Designs



## Observational Studies

### Analytical Studies:

#### Cohort Studies



These types of studies can be prospective to answer the "what will happen?" or retrospective to answer the "what happened?».

In prospective cohort studies, the frequency of occurrence of the disease is compared in subjects with and without risk factors at the end of the determined time period, and a decision is made about whether the risk factor is important or not.

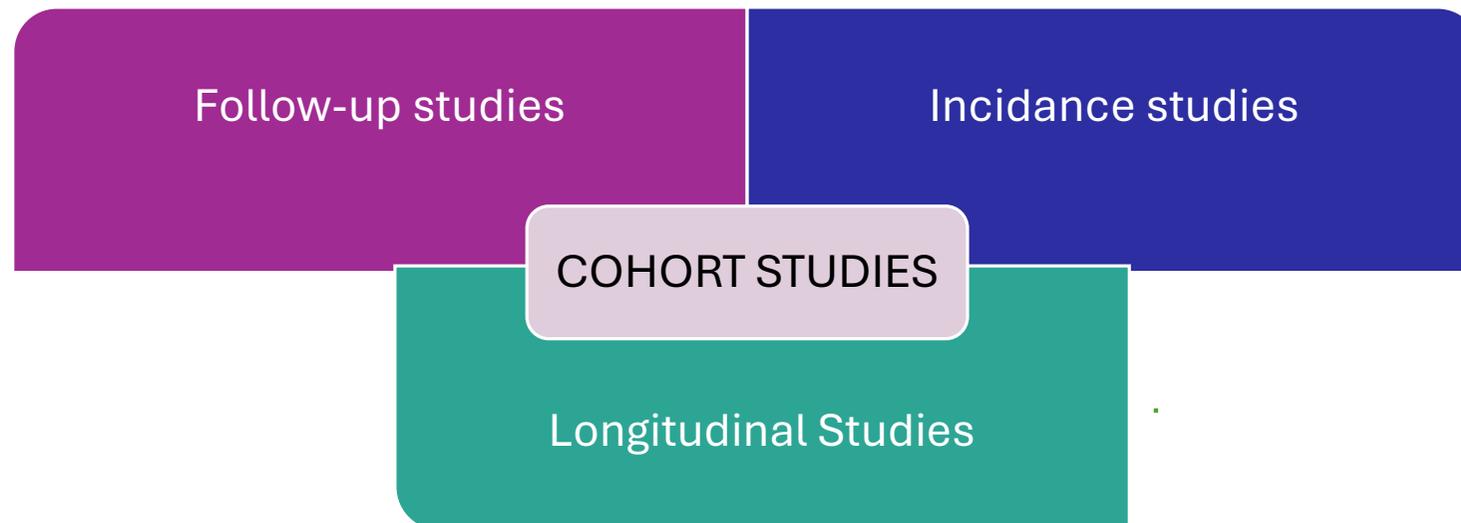
What does cohort mean?

»Group of people with a shared characteristic«

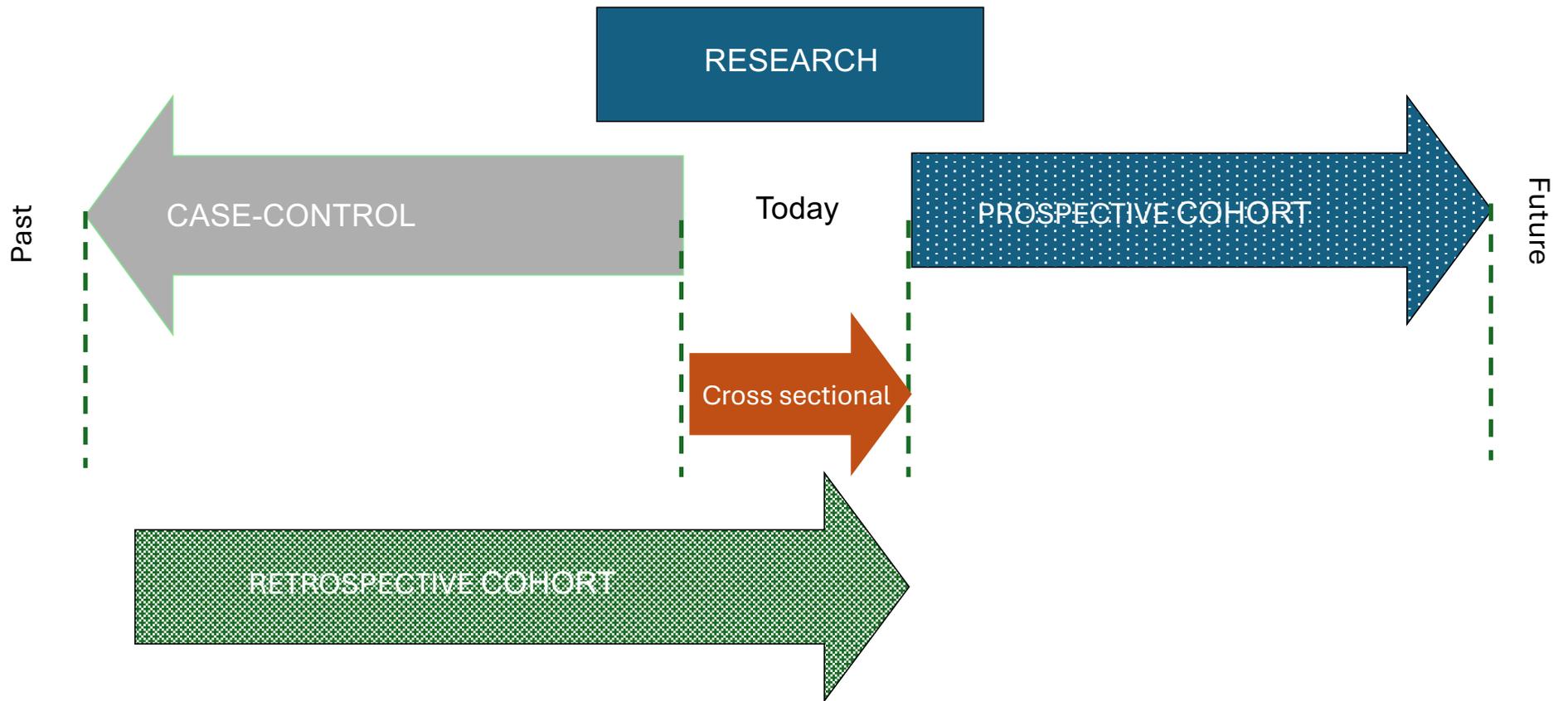
## Observational Studies

Analytical Studies:

Cohort Studies



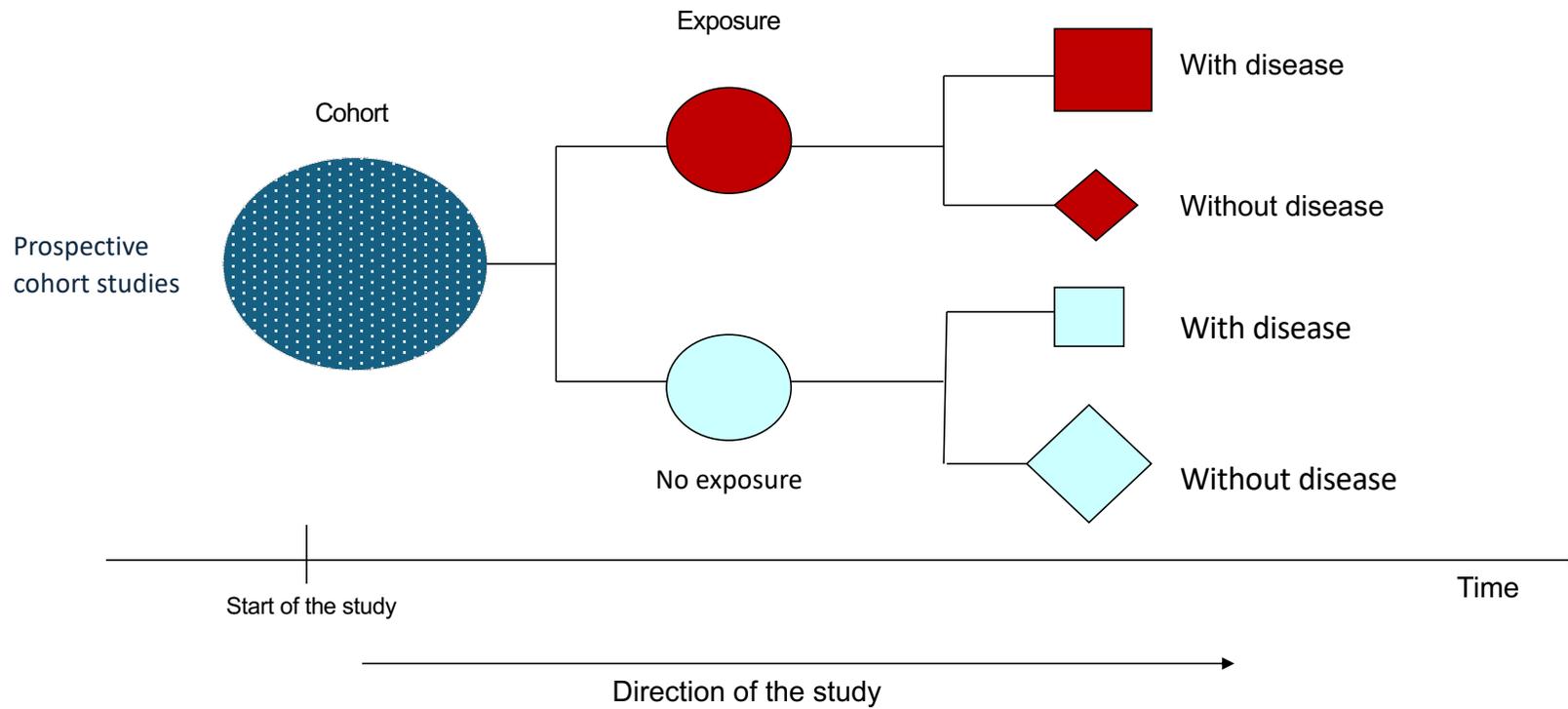
# Evaluation of different types of observational studies according to time factor



# Observational Studies

## Analytical Studies:

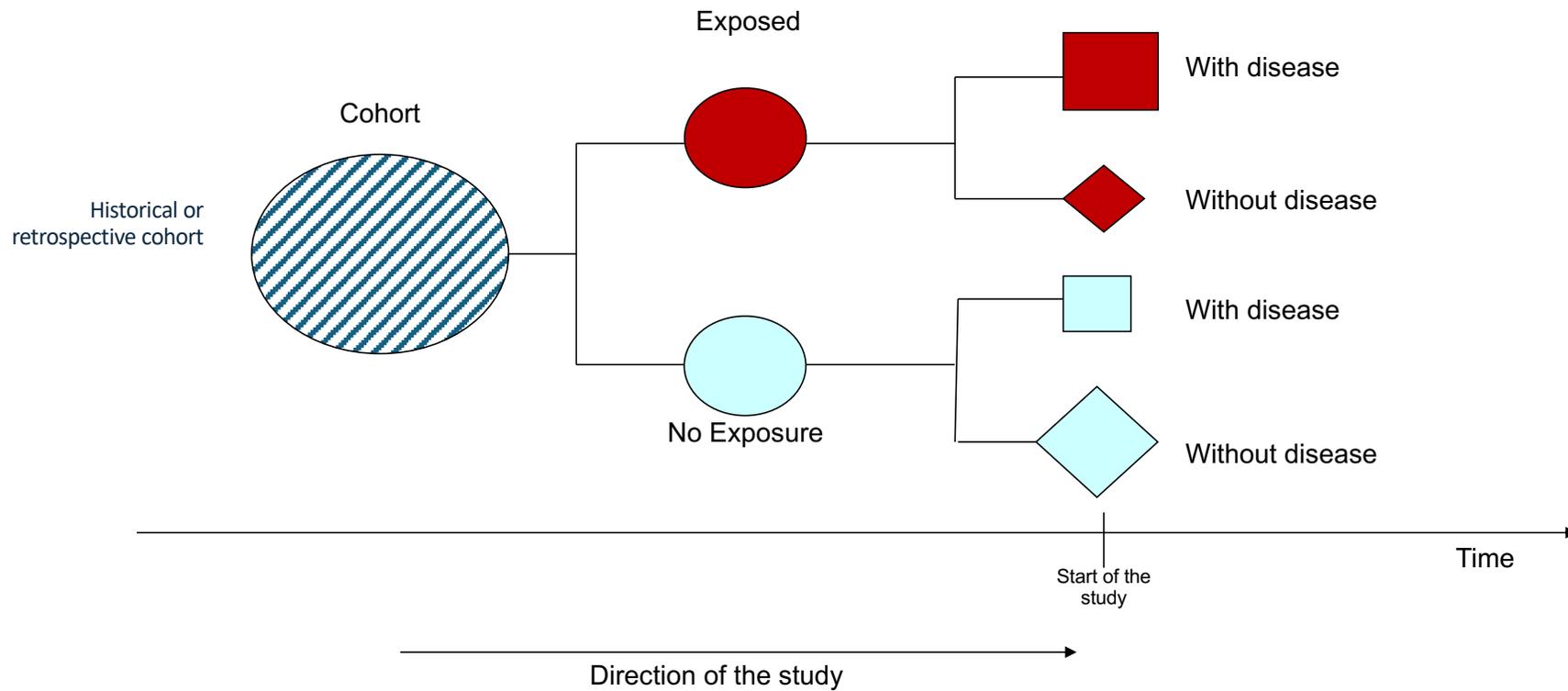
### Prospective Cohort Studies



# Observational Studies

## Analytical Studies:

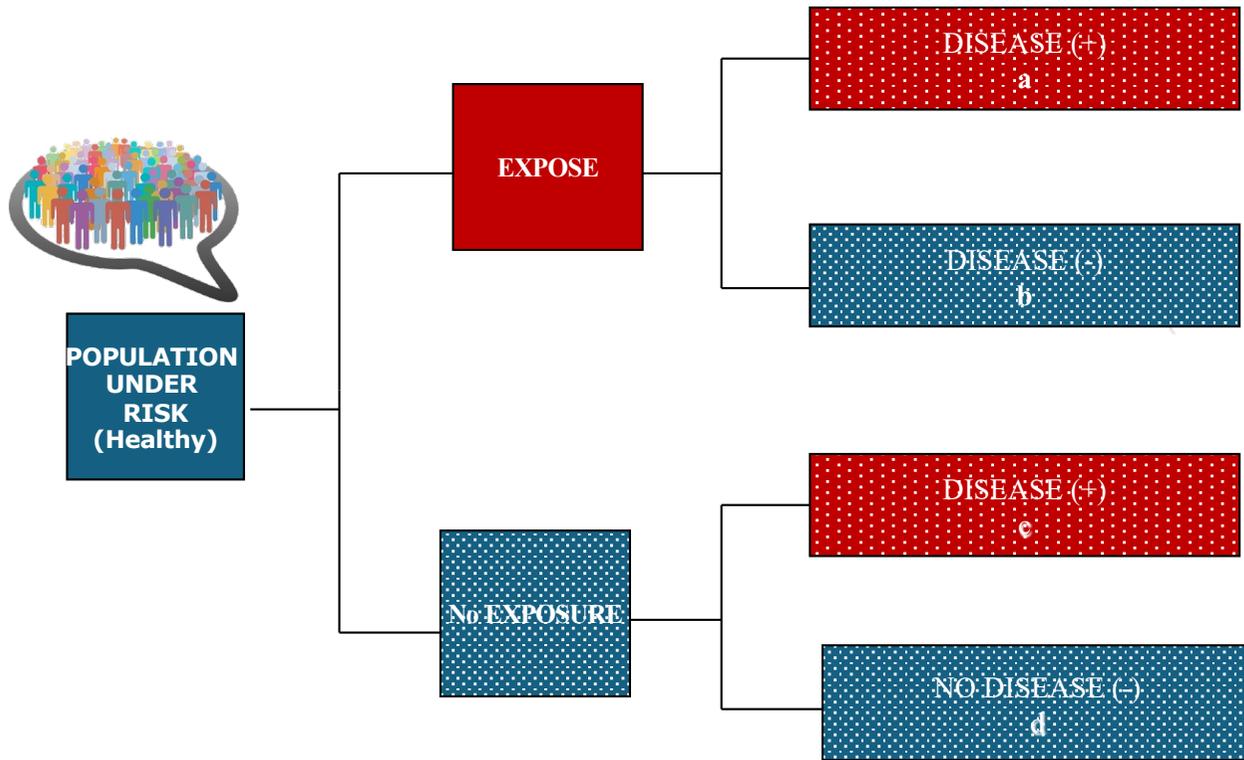
### Retrospective Cohort Studies



# Observational Studies

## Analytical Studies:

Cohort Studies



## Measures of disease & association in Cohort studies

- Incidence
- Relative risk
- Attributable risk or risk difference

	Disease +	Disease -
Exposure +	a	b
Exposure -	c	d

# Observational Studies

## Analytical Studies:

Cohort Studies

	Disease +	Disease -
Exposure +	a	b
Exposure -	c	d

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

$$\text{incidence (exposure (+))} = \frac{a}{a+b} \times 100$$

$$\text{incidence (exposure (-))} = \frac{c}{c+d} \times 100$$

## Measures of disease & association in Cohort studies

- Incidence
- Relative risk
- Attributable risk or risk difference

$$\text{Relative Risk} = \frac{\text{incidence (exposure (+))}}{\text{incidence (exposure (-))}}$$

$$\text{Attributable Risk} = \text{incidence (exposure (+))} - \text{incidence (exposure (-))}$$

## How to interpret relative risk values??

### Relative risk = 1.0

the incidence rate is the same among exposed and non-exposed subjects and indicates a lack of association between exposure and disease

### Relative risk > 1.0

suggests that exposed people are at higher risk of disease than non-exposed persons.

### Relative risk < 1.0

provides evidence for a protective effect of exposure (the incidence rate of disease among exposed is lower than non-exposed)

## Cohort Studies



### PROS

- Researcher is certain that the exposure preceded the outcome, and temporality (and therefore probable causality) can be established.
  - The cause-effect relationship is strongly demonstrated.
- Incidence rate can be obtained
- For a given exposure, more than one outcome can be studied simultaneously
- Results from cohort studies can be generalized to the relevant population.

### CONS



- Require a long duration of follow-up to determine whether outcome will occur or not.
- Maintaining high rates of follow-up can be difficult.
- Costs are relatively higher than any other observational studies.
- Change of behavioral characteristics during follow-up is another problem.
- Especially in retrospective cohort studies, the reliability of the records is very important.
- Not suited for the study of rare diseases because a large number of subjects is required.

# Observational Studies

## Analytical Studies:

### Cohort Studies

## Cohort vs Case-Control Studies

- Both investigate the causes and risks of the disease.
- Which design the researcher chooses depends in part on the research question.
- Cohort research starts from a risk factor or exposure and looks at outcomes (Study direction is always forward ; Exposure to Outcome)
- Case control research, its result; as starting point for research and looks at risk factors or exposures (Study direction is always backwards; Outcome to Exposure )