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السلام عليكم ورحمة الله وبركاته



# Epidemiological and Research Studies

## Part 3

### Cohort Study

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## ~~Observational studies~~

### ~~Descriptive~~

~~Case report~~

~~Case series~~

~~Epidemiological reports~~

~~Cross-sectional~~

### ~~Analytical studies~~

~~Cross-sectional~~

~~Case-control~~

~~Cohort~~

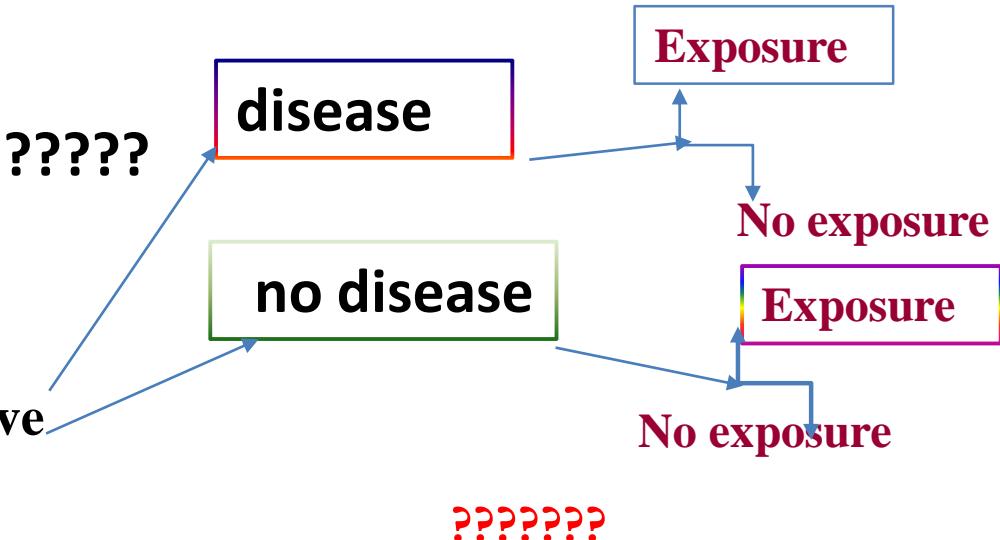
## ~~□ Intervention(experimental studies)~~

- Clinical trials
- Community trials

## Cross-sectional

It begins with population?????

looking to identify who have



## Case-control

### TROHOC

It begins with group of people **classified into**  
**diseased** and **not diseased**

And looking backward  
to identify who are

exposed to a risk factor  
unexposed to the risk factor

- It begins with group of people **free of disease** and **classified into subgroups**
  - ❖ a **group** of individuals **exposed to a risk factor**
  - ❖ a **group** who are **unexposed to the risk factor**
- **are followed over time** (often years)

# Cohort Study

# Cohort Study

Also called : **follow up study or incidence studies**,

**Definition:**

Study in which persons,

- based on their **exposure to a determinant**
- and **free of the disease outcome at the start of the study**
- **are followed in time to**
- **assess the occurrence of the disease outcome**

- It begins with a group of people who **are free of disease** and who are
- **classified into subgroups according to exposure** to a potential cause of disease or outcome .
- Variables of interest are **specified** and **measured** and
- **the whole cohort** is followed up **to see how the subsequent development of new cases of the disease** (or other outcome
- differs between the groups **with** and **without exposure**.

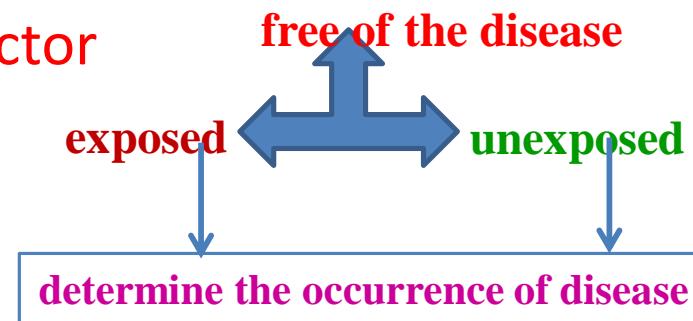
- Cases are excluded at the beginning

# Cohort Studies

Cohort studies are a **form of longitudinal study** design that **flows from the exposure to outcome**.

**In a cohort study,**

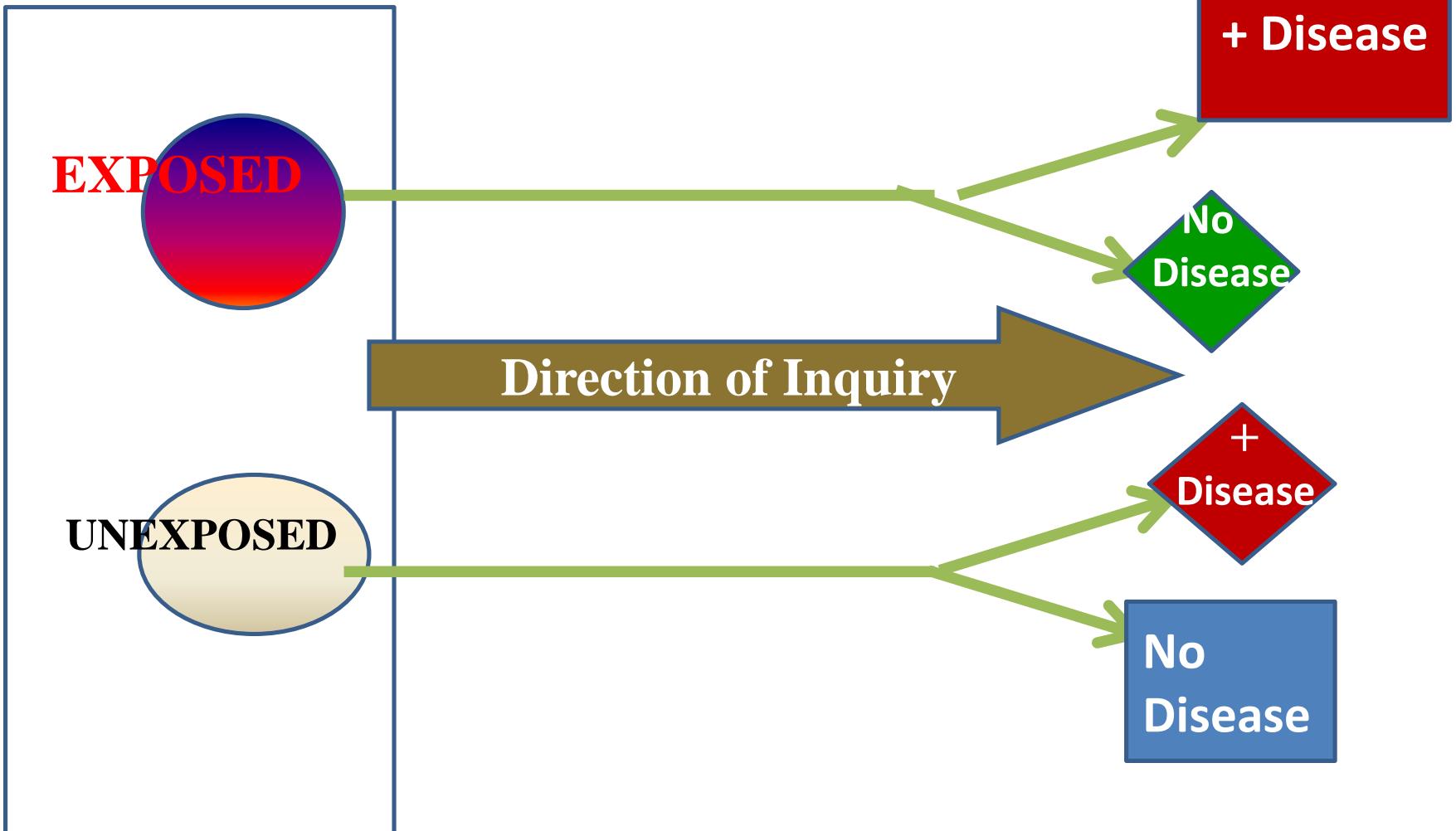
- a group of individuals **exposed to a putative risk factor** and
  - a group who are **unexposed to the risk factor**
  - are followed over time (often years)
  - to **determine the occurrence of disease.**
- The **incidence** of disease
- ✓ in the **exposed group** is **compared**
- ✓ **with the incidence** of disease in the **unexposed group.**



❑ Cohort studies be **prospective**

A **prospective cohort** study is also called a **concurrent cohort study**,  
where the **subjects have been followed up for a period and**  
**the outcomes of interest are recorded.**

# Design of a Prospective Cohort Study



It begins with group of people **free of disease** and **classified into subgroup**  
**a group of individuals exposed to a risk factor**  
**a group who are unexposed to the risk factor**  
are followed over time (often years)



## Selection of study groups

- ❖ The aim of a cohort study is to **select study participants who are identical with the exception of their exposure status.**
- ❖ All study participants must be
  - Free of the outcome under investigation and
  - have the potential to develop the outcome under investigation.

## □ Measuring exposure

Levels of exposure are (e.g. packs of cigarettes smoked per year)

- ❖ measured for each individual at baseline at the beginning of the study and
- ❖ assessed at intervals during the period of follow-up.

## □ A particular problem occurring in cohort studies is whether individuals

- in the control group are truly unexposed.



## Measuring exposure

**in the control group are truly unexposed.** For example, study participants may start smoking or

- Similarly, those in the
- exposed group may change their behavior in relation to the exposure such as diet, smoking or alcohol consumption.**

## Measuring outcome

Outcome measures may be obtained from various sources, including

- directly from the participant
- medical records or
- routine surveillance of cancer registry data,
- death certificates,

## Method used to ascertain outcome

- ✓ must be identical for both exposed and unexposed groups.

## Methods of follow-up

- ❖ The follow-up of study participants in a cohort study **is a major challenge.**
- A great deal of **cost and time is required to ensure follow-up** of cohort members

The failure to collect outcome data for all members of the cohort will **affect the validity of study results**

## Analysis of cohort studies

?????

- **in the exposed cohort**
- **compared with the**
- 
- **rate or risk in the unexposed cohort.**

## Analysis of cohort studies

Example:

Cont.....cohort studies

A study done to see if smoking is a risk factor for cancer of the pancreas .A sample of **90,049** individuals was chosen ,of them **27,042** were smokers, the remaining were not. Both groups were followed for one year, **42**and **7**, cases of CA pancreas was detected in smoker and non smoker group respectively .Can we conclude, that smoking is a risk factor for Ca pancreas

?????

Smoking	CA Pancreas	No CA Pancreas	Total
Positive	42		<b>27,042</b>
Negative	7		
Total			<b>90,049</b>

?????

## Cont. ..Analysis of cohort studies

### Example:

A study done to see if smoking is a risk factor for cancer of the pancreas .A sample of 90,049 individuals was chosen ,of them 27,042 were smokers, the remaining were not. Both groups were followed for one year, 42and 7, cases of CA pancreas was detected in smoker and non smoker group respectively .Can we conclude, that smoking is a risk factor for Ca pancreas

Smoking	CA Pancreas	No CA Pancreas	Total	?????
Positive	42	27,000	27,042	
Negative	7	6300	63007	
Total	49	90000 <sub>r0</sub>	90,049	

?????

Incidence rate of disease in exposed group (r1) =no. of disease among exposed  
no. of exposed person

Incidence rate of disease in un exposed group (r0) =no. of disease among un exposed  
no. of un exposed person



## Example:

A study done to see if smoking is a risk factor for cancer of the pancreas .A sample of 90,049 individuals was chosen ,of them 27,042 were smokers, the remaining were not. Both groups were followed for one year, 42and 7, cases of CA pancreas was detected in smoker and non smoker group respectively

.Can we conclude, that smoking is a risk factor for Ca pancreas

	Cancer of the pancreas	No disease	Total	Incidence rate
Smokers	42	27,000	27,042	1.5/1000/yr
Non-smokers	7	63,000	63,007	0.1/1000/yr
Total	49	90,000	90,049	

Can we conclude, that smoking is a risk factor for Ca pancreas

Measurements of risk

?????

?????

?????



## Cont....cohort studies

### 4. Strengths and weaknesses of cohort studies

#### Weaknesses

- Costly and time consuming.
- Prone to bias due to loss to follow-up.
- Participants may move between one exposure category
- Poor choice for the study of a rare disease.
- Classification of individuals (exposure or outcome status) can be affected by changes in diagnostic procedures.

#### Strengths

- ✓ **Multiple outcomes** can be measured for any one exposure.
- ✓ **Exposure is measured before the onset of disease**
- ✓ **Good for measuring rare exposures**, for example among different occupations.
- ✓ **Demonstrate direction of causality**.
- ✓ **Can measure incidence**

# Thank you for attention

