

سُبْحَانَ اللَّهِ
الرَّحْمَنِ الرَّحِيمِ



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)

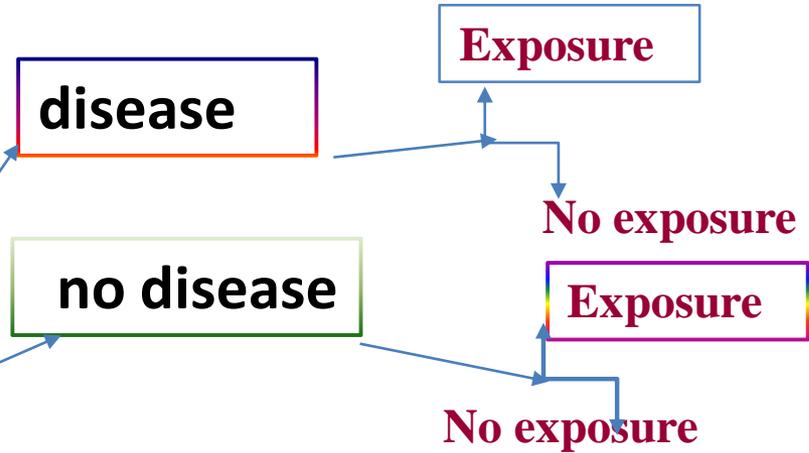
➤ Clinical trials

➤ Community trials

Cross-sectional

It begins with population?????

looking to identify who have



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Case-control

TROHOC

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

And looking backward to identify who are



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- ❑ 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**.

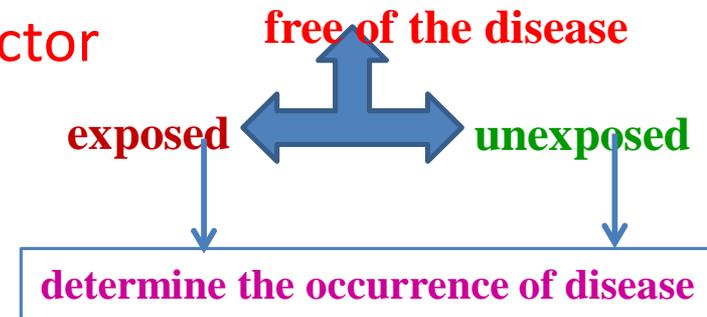
☐ The **incidence of disease**

✓ in the **exposed group** is **compared**

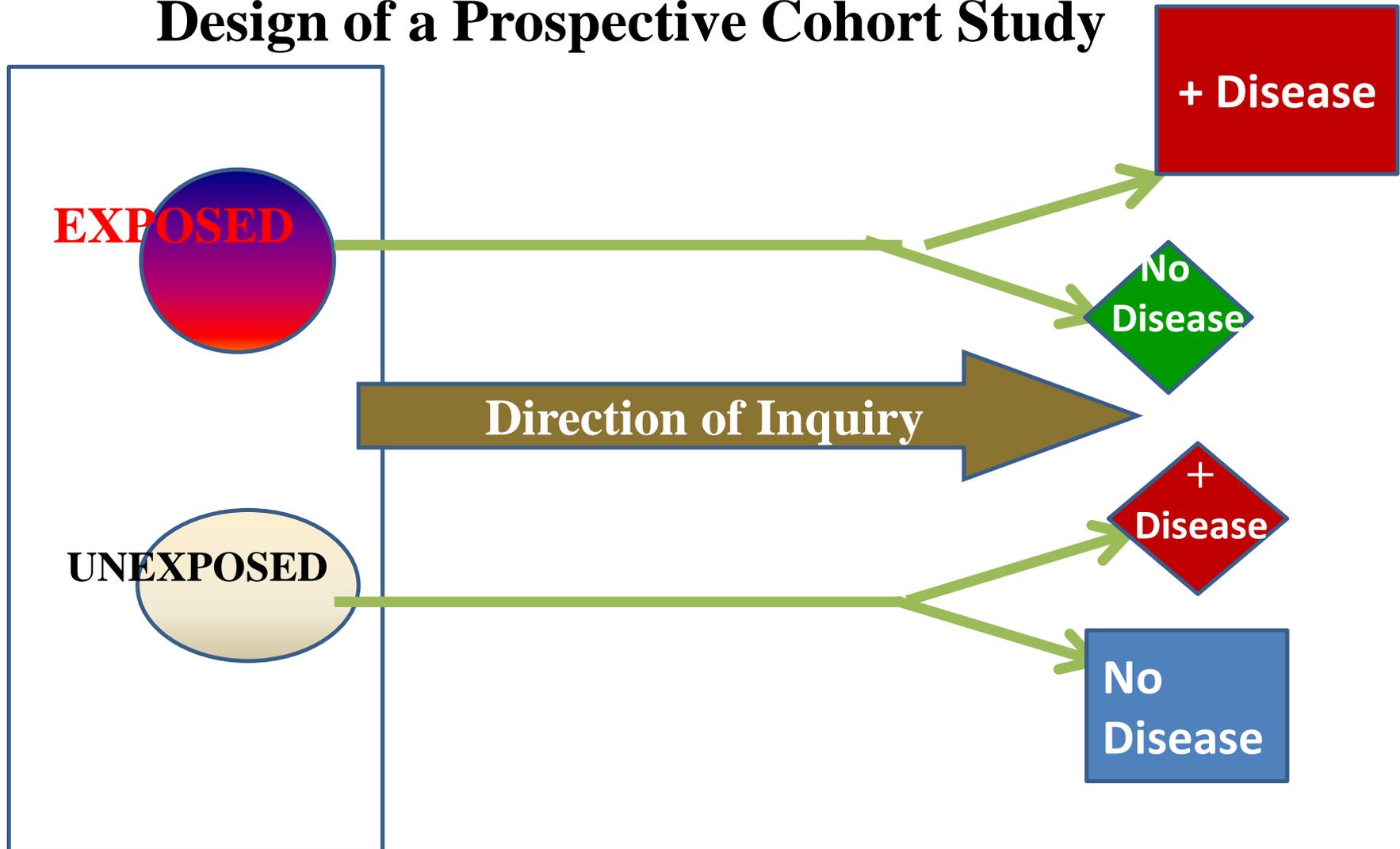
✓ **with** the **incidence** of disease in the **unexposed group**.

☐ 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

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- 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

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Smoking	CA Pancreas	No CA Pancreas	Total
Positive	42		27,042
Negative	7		
Total			90,049

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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, 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	27,000	27,042
Negative	7	6300	63007
Total	49	90000	90,049

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Incidence rate of disease in exposed group (r_1) = $\frac{\text{no. of disease among exposed}}{\text{no. of exposed person}}$

Incidence rate of disease in un exposed group (r_0) = $\frac{\text{no. of disease among un exposed}}{\text{no. of un exposed person}}$



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, 42 and 7 cases of CA pancreas were 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

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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



Qs ?????