TUTORIALS

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Happy Learning!

# BIOSTATISTICS FOR PEDIATRIC RESIDENTS PART 1

## Study designs

00:02:45

- Cross-sectional study
  - Cross-section of population is taken at 1 point
  - Descriptive study design
  - The best way to do a cross-sectional study is doing a survey of population,for example take group of patients in hospital and describe it by % of disease, % of risk factor
  - Prevalence is the result you get from a cross-sectional study design.
- Case control study
  - Analytical study design
  - There will be an exposure and an outcome and the study is to find an association between them.
  - Start from cases (diseased) and controls (non-diseased)
  - Start from disease and go back in the past to find out exposure status.
- Cohort study
  - Analytical study design
  - There will be an exposure and an outcome and the study is to find an association between them.
  - Start from exposed and non-exposed
  - Start from exposure and follow them into the future to see what percentage of them have developed the disease.

## Case control study

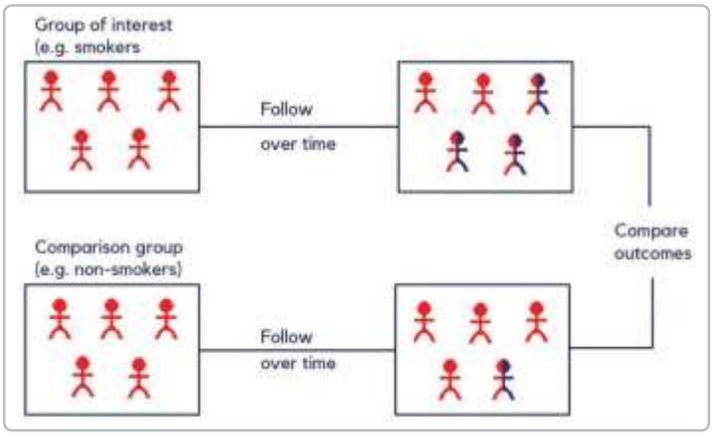
00:07:27


- E.g.: To find out the relationship between smoking and lung cancer.
- Two groups, one of lung cancer patients(Group of interest) and another of non-lung cancer patients(comparison group) are taken and their history is taken to know their association with smoking. After that their exposure status is measured and their difference is calculated for comparison.

## Cohort

00:08:38

- Cohort means group of army men  similar looking(having common exposure in our case)
- Similarly two study groups are taken one with smokers( group of interest) and another with non smokers (comparison group), make sure at the start of the study none of them have the outcome.
- A prospective study of both groups over a defined period to determine the difference in the relationship between exposure and outcome.




Q. 20 pregnant women were asked about h/o smoking when they came for regular antenatal visits and then followed up to see how many of them had LBW babies. What is the type of study

Ans: Cohort

Q. A study was done in 3 states to see the mean BP in each community. Health workers were assigned and they visited each house in the 3 communities. Mean BP in each community was found and compared. What type of study design is represented here

Ans: Cross sectional study

Q. In a hospital DVT patients were taken and they were compared with other patients to find the risk factors. What type of study is this?

Ans: Case control

## Risk measure

00:11:11

- It gives the Strength of association.
- The risk measure in case control study is the Odds ratio:
  - Probability of exposure among cases and control is measured.
    - Example: A case control study of 100 smokers and 100 non-smokers to look for association with smoking.
    - Construct a 2×2 table
    - CD in column  always write diseased in the columns and risk factor in the rows
    - Odds ratio a/k/a cross product ratio

| | Lung Cancer | | |
|---|---|---|---|
| Smoking | Present (Cases) | Absent (Controls) | |
| Present | 60 | 20 | 80 |
| Absent | 40 | 80 | 120 |
| Total | 100 | 100 | 200 |

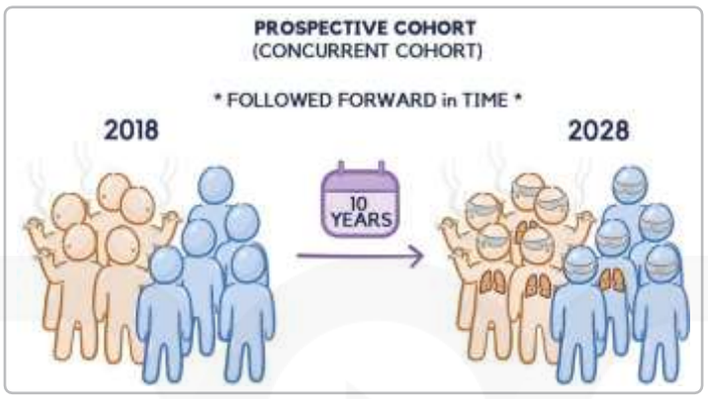
- Odds ratio = ad / bc
  - A = 60
  - B = 20

- C = 40
- D = 80

- Odds ratio= (60×80) / (40×20) = 6
  - Interpretation: smokers have 6 times more chance for developing lung cancer than non- smokers
  - Odds ratio =1 □ no association
  - Odds ratio <1 □ protective factor
- Interpretation of Odds ratio
  - OR > 1 □ exposure is risk factor
  - OR < 1 □ exposure is protective factor
  - OR=1 □ no association between exposure and outcome

## Risk measure in Cohort

00:17:04




## Outcome measures in a cohort study

00:17:12

1. Incidence
   - No. of new cases of the disease that have developed in the exposed and unexposed at end of follow-up time
2. Relative risk (RR)/Risk ratio
3. Attributable risk (AR)
4. Population attributable risk (PAR)

## Relative risk (risk ratio)

00:18:07

- In relation to the nonexposed, how many times more is the chance for exposed to develop the outcome
- Risk ratio= incidence among exposed / incidence among nonexposed
- Example:

| | Lung Cancer | | |
|---|---|---|---|
| Smoking | Present (Cases) | Absent (Controls) | |
| Present | 10 | 90 | 100 |
| Absent | 2 | 98 | 100 |
| Total | 12 | 188 | 200 |

- Incidence of lung cancer among smokers = 10/100

- Incidence of lung cancer among nonsmokers = 2/100
- Rr= (10/100) / (2/100) = 5
- Interpretation: Smokers have 5 times more chance for developing lung cancer than nonsmokers