Epidemiologic studies

Mario Merialdi
merialdim@who.int
022-7913387
Office X 39

Postgraduate Training in Reproductive Health Research
Faculty of Medicine, University of Yaoundé 2007

- **1) The association between low birth weight and maternal smoking during pregnancy can be studied by obtaining smoking histories from women at the time of the prenatal visit and then subsequently correlating birth weight with smoking histories. What type of study is this?**

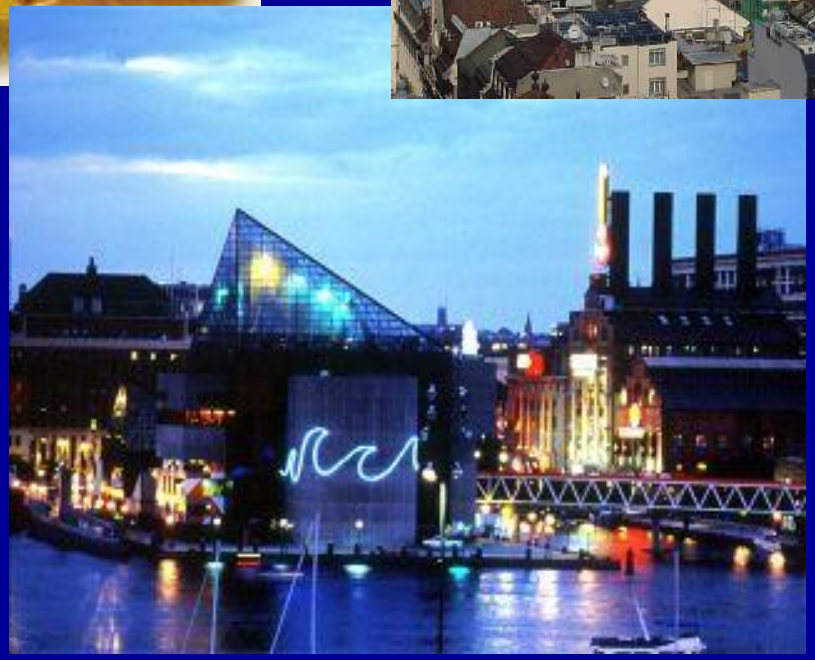
- A) Clinical trial
- B) Cross-sectional
- C) Cohort
- D) Case-control
- E) None of the above

- **In the study of the causes of a disease, the essential difference between an experimental and an observational study is that in the experimental investigation**

- **A) The study is prospective**
- **B) The study is retrospective**
- **C) The study and control group are of equal size**
- **D) The study and control groups are selected on the basis of history of exposure to the suspected causal factor**
- **E) The investigators determine who is and who is not exposed to the suspect causal factor**

- **3) In a study of the cause of lung cancer, patients who had the disease were matched with controls by age, sex, place of residence, and social class. The frequency of cigarette smoking was there compared in the two groups. What type of study was this?**

- A) Cohort (concurrent)
- B) Cohort (non concurrent)
- C) Clinical trial
- D) Case control
- E) None of the above



Association

- Is a disease or a condition more or less often present in persons with the characteristic of interest?
- The characteristic could be:
  - A risk factor (smoking)
  - A protective factor (healthy diet, treatment)

Two main types of studies

- Observational: the epidemiologist observes the association between exposure and outcome (e.g. smoking and lung disease)
- Experimental: the epidemiologist performs an experiment, he/she controls the conditions under which the study is conducted (he/she is able to assign subjects to a treatment or comparison group and then follow them up to see if there are differences in the occurrence of disease between the two groups; e.g. calcium supplementation and pre-eclampsia)

Two types of observational studies

- Cohort study: one begins with a group of persons exposed to a factor of interest and a group of persons not exposed. The persons are then followed for the development of the disease of interest.
- Case-control study: one assemble a group of persons with a disease (cases) and a group of persons with no disease (controls). The history of past exposure to the factor of interest is then compared between the cases and controls.

Two types of experimental studies

- Randomized clinical trial: similar persons are allocated by the epidemiologist to the treatment and control groups.
- Community trial: similar communities (villages, clinics) are allocated by the epidemiologist to the treatment and control groups.

Summary

Controlled a

EXPERIM
STU

Community assignment

COMMUNITY TRIAL

CLINICAL TRIAL

ssignment

TIONAL
DY

Sampling with regard to exposure

CASE-CONTROL STUDY

COHORT STUDY

It is a strategy game!

Your enemy

NON CAUSAL ASSOCIATIONS

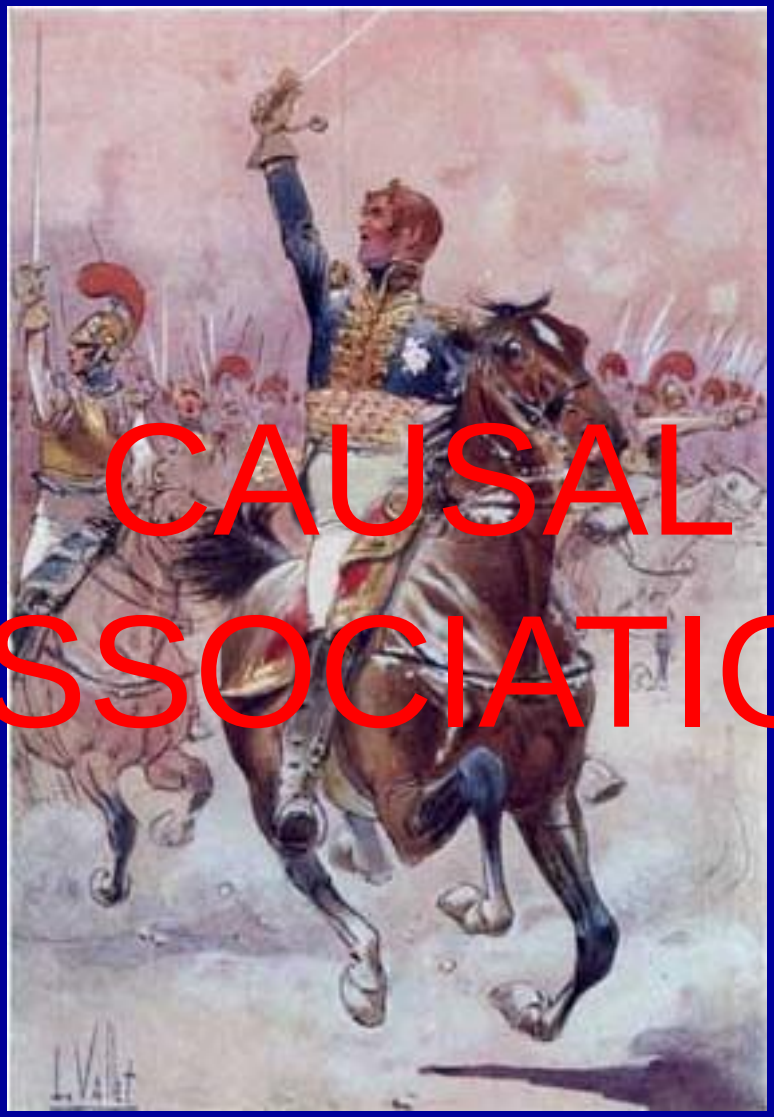
Artifactual (spurious) associations

- Biased methods of selecting cases and controls (estrogens and endometrial cancer)
- Biased method of recording information (automobile driving and herniated vertebral discs)
- Errors in the design or conduct of the study (nonrepresentative study groups, misclassification of exposure or disease, measurements errors, lost to follow up, observer bias)

Confounding

- The association between exposure to a factor and the consequent development of disease is distorted by an additional variable that is itself associated both with the factor and with the disease (coffee, smoking, lung cancer)

You win!



CAUSAL ASSOCIATION

Assessing causality

- Strength of the association
- Consistency of the observed association
- Specificity of the association
- Temporal sequence of events
- Dose response relationship
- Biological plausibility
- Experimental evidence

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