Epidemiologic Studies

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From Research to Practice:
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Objective of Presentation

- This presentation provides a short overview of epidemiologic study designs and distinguish between experimental and observational epidemiologic studies.

- This presentation will be followed by detailed presentations on each epidemiologic study (cohort, case-control, cross-sectional, clinical trials).

Epidemiology, Definition

- Epidemiology is considered a basic science of public health.
- “Epidemiology is the study of how disease is distributed in population and the factors that influence or determine this distribution.”
- “Epidemiology is the study of the distribution and determinants of health-related states or events in specified populations and the application of this study to control of health problems.”

Gordis L. Epidemiology. 4th ed. Saunders; 2008.

Epidemiologic Studies

- “The goal of every epidemiologic study is to gather correct and sharply defined data on the relationship between an exposure and a health-related state or event in a population. The main study designs represent different ways of gathering this information. Given the strengths and weaknesses of each design, there are circumstances for which a particular type of study is clearly indicated”.

Aschengrau A, Seage GR. Essentials of epidemiology in public health. Jones & Bartlett Publishers; 2008.

Epidemiologic Studies

- There are two main types of epidemiologic studies:
  - Experimental
  - Observational

Experimental Studies

- In experimental studies the investigator assesses the efficacy of an agent or intervention for the treatment or prevention of diseases or health problems.
- He /she enrols subjects into two groups: those who receive the agent or intervention (**called treatment group**) and those who do not receive it (**called comparison group**).
- He /she controls the exposure.
- If the investigator assigns treatment at random, the study is known as randomized clinical trial (RCT).
- Experimental studies can also be used for non-clinical purposes, for example community-based interventions such as community mobilisation and education on family planning.

Experimental Studies

The links below provide access to some examples of experimental studies:

- Krishna S, Balas EA, Francisco BD, Konig P. Effective and Sustainable Multimedia Education for Children With Asthma: A Randomized Controlled Trial. Children's Health Care. 2006 Mar 1;35(1):75-90. http://dx.doi.org/10.1207/s15326888chc3501_7
- Lycett D, Hajek P, Aveyard P. Trial Protocol: Randomised controlled trial of the effects of very low calorie diet, modest dietary restriction, and sequential behavioural programme on hunger, urges to smoke, abstinence and weight gain in overweight smokers stopping smoking. Trials. 2010;11:94. http://dx.doi.org/10.1186/1745-6215-11-94

Observational Studies

The two principal types of observational studies

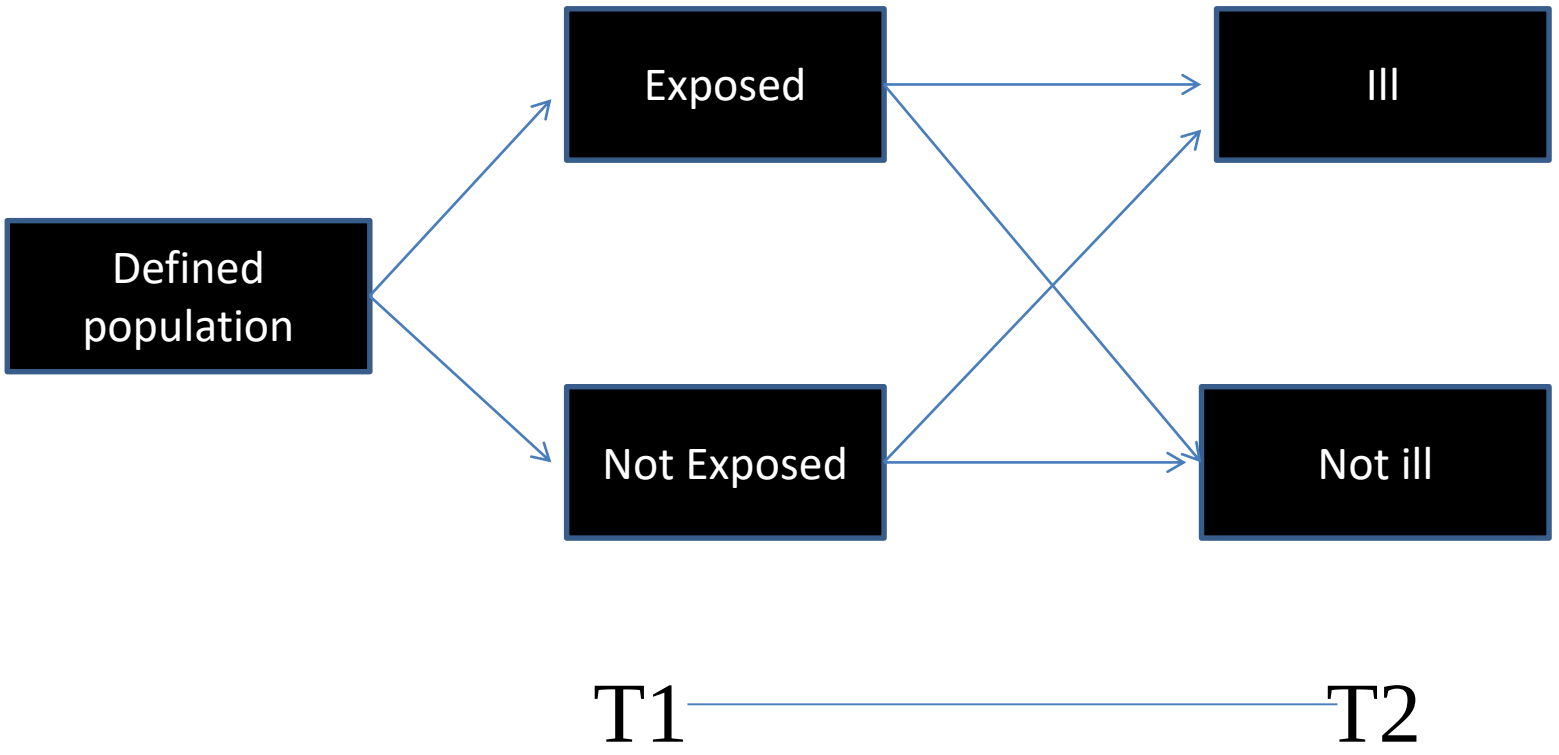
1. Cohort and
2. Case–control

Cohort Study

- In cohort the study population is composed of individuals classified as exposed and not- exposed to a particular agent or condition.

- Both groups are followed for a specific time period to estimate the occurrence of an outcome or development of a health problem.

Cohort Study



Cohort Study

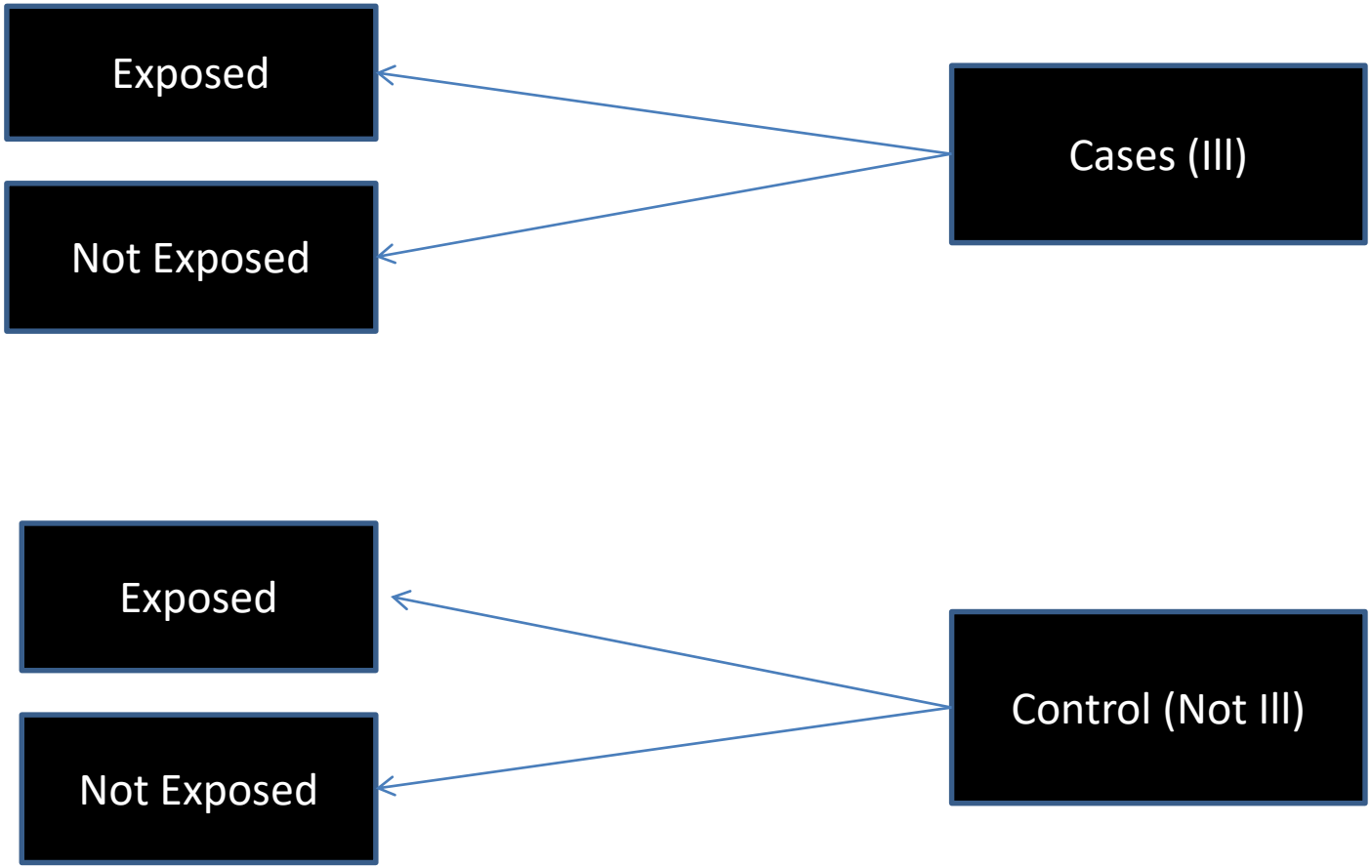
The links below provide access to some examples of cohort study:

- de Oliveira RVB, Martins M da G, Rios LTM, Araujo Júnior E, Simões VMF, Nardozza LMM, Moron AF. Predictive model for spontaneous preterm labor among pregnant women with contractions and intact amniotic membranes. Arch Gynecol Obstet. 2012 Oct;286(4):893-900. http://dx.doi.org/10.1007/s00404-012-2397-0
- Maman D, Glynn JR, Crampin AC, Kranzer K, Saul J, Jahn A, Mwinuka V, Ngwira MH, Mvula H, Munthali F, McGrath N. Very early anthropometric changes after antiretroviral therapy predict subsequent survival, in karonga, Malawi. Open AIDS J. 2012;6:36-44. http://dx.doi.org/10.2174/1874613601206010036

Case Control Study

- The case control study determines the association of an exposure to a disease, by identifying a group of individuals with disease and for purpose of comparison, a group of people without disease.
- The investigator collects retrospectively information on exposure history to a risk factor from both groups.
- Subjects with disease are called **cases** and subjects without disease are called **controls**.

Case Control Study



Case Control Stud

The link below provides access to an example of case control study:

- Heit JA, Silverstein MD, Mohr DN, Petterson TM, O'Fallon WM, Melton LJ. Risk Factors for Deep Vein Thrombosis and Pulmonary Embolism: A Population-Based Case-Control Study. Arch Intern Med. 2000 Mar 27;160(6):809-15. http://dx.doi.org/10.1001/archinte.160.6.809

Cross–Sectional Studies

- Cross-sectional studies determine the relationship of an exposure to the outcome of interest. For example high level of cholesterol and ECG evidence for ischemia.
- We survey a defined group of population for a period of time. As for the above example, for each study participant, we determine the serum cholesterol level and ECG evidence for ischemia.
- Cross-sectional study is also called “Prevalence study”.

Cross–Sectional Studies

- Cross sectional studies measure simultaneously the exposure and health outcome in a given population and in a given geographical area at a certain time.
- It provides a snapshot on the prevalence and characteristics of health problem or condition in a population.
- Cross-sectional studies are mostly carried out for public health planning. For example “Knowledge, attitude and practice (KAP) of family planning methods among women attending antenatal clinic in area x” is a cross-sectional study.

Cross–Sectional Studies

The links below provide access to some examples of cross-sectional studies:

- Nguyen PH, Budiharsana MP. Receiving voluntary family planning services has no relationship with the paradoxical situation of high use of contraceptives and abortion in Vietnam: a cross-sectional study. BMC Women's Health. 2012;12:14. http://dx.doi.org/10.1186/1472-6874-12-14
- Kries R von, Koletzko B, Sauerwald T, Mutius E von, Barnert D, Grunert V, Voss H von. Breast feeding and obesity: cross sectional study. BMJ. 1999 Jul 17;319(7203):147-50. http://dx.doi.org/10.1136/bmj.319.7203.147

References

- Aschengrau A, Seage GR. Essentials of epidemiology in public health. Jones & Bartlett Publishers; 2008.
- CDC. Reproductive Health- Data and Statistics: Epidemiology Glossary [Internet]. CDC. 2015- [cited 2017 May]. Available from: https://www.cdc.gov/reproductivehealth/data_stats/glossary.html
- Evidence Based Medicine Toolkit: Clinical Epidemiology Glossary [Internet]. Buckingham Jeanette, Fisher Bruce, Saunders Duncan. c2008- [cited 2017 May]. Available from: http://www.ebm.med.ualberta.ca/Glossary.html
- Gordis L. Epidemiology. 4th ed. Saunders; 2008.