



# 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.”



## 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”.



## 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 enrolls 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. [doi: 10.1207/s15326888chc3501\\_7](https://doi.org/10.1207/s15326888chc3501_7)
- Müller O, Traoré C, Kouyaté B, Yé Y, Frey C, Coulibaly B, Becher H. Effects of insecticide-treated bednets during early infancy in an African area of intense malaria transmission: a randomized controlled trial. *Bull World Health Organ*. 2006 Feb;84(2):120-6. Available from: <http://www.who.int/bulletin/volumes/84/2/120.pdf>



# Observational Studies

The two principal types of observational studies

1. Cohort and
2. Case-control



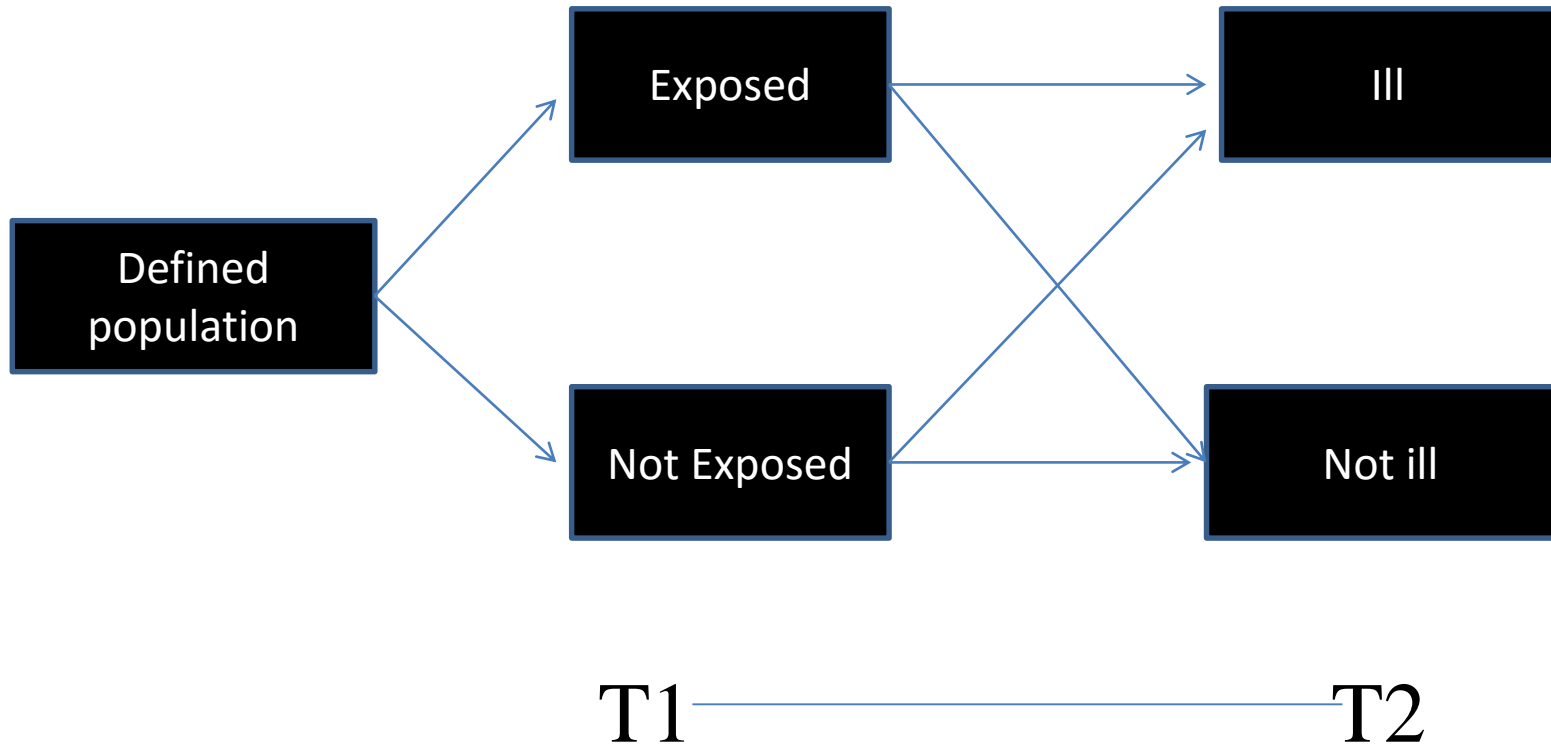


## Cohort Study

- 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, Nardoza 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. [doi: 10.1007/s00404-012-2397-0](https://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. [doi: 10.2174/1874613601206010036](https://doi.org/10.2174/1874613601206010036)

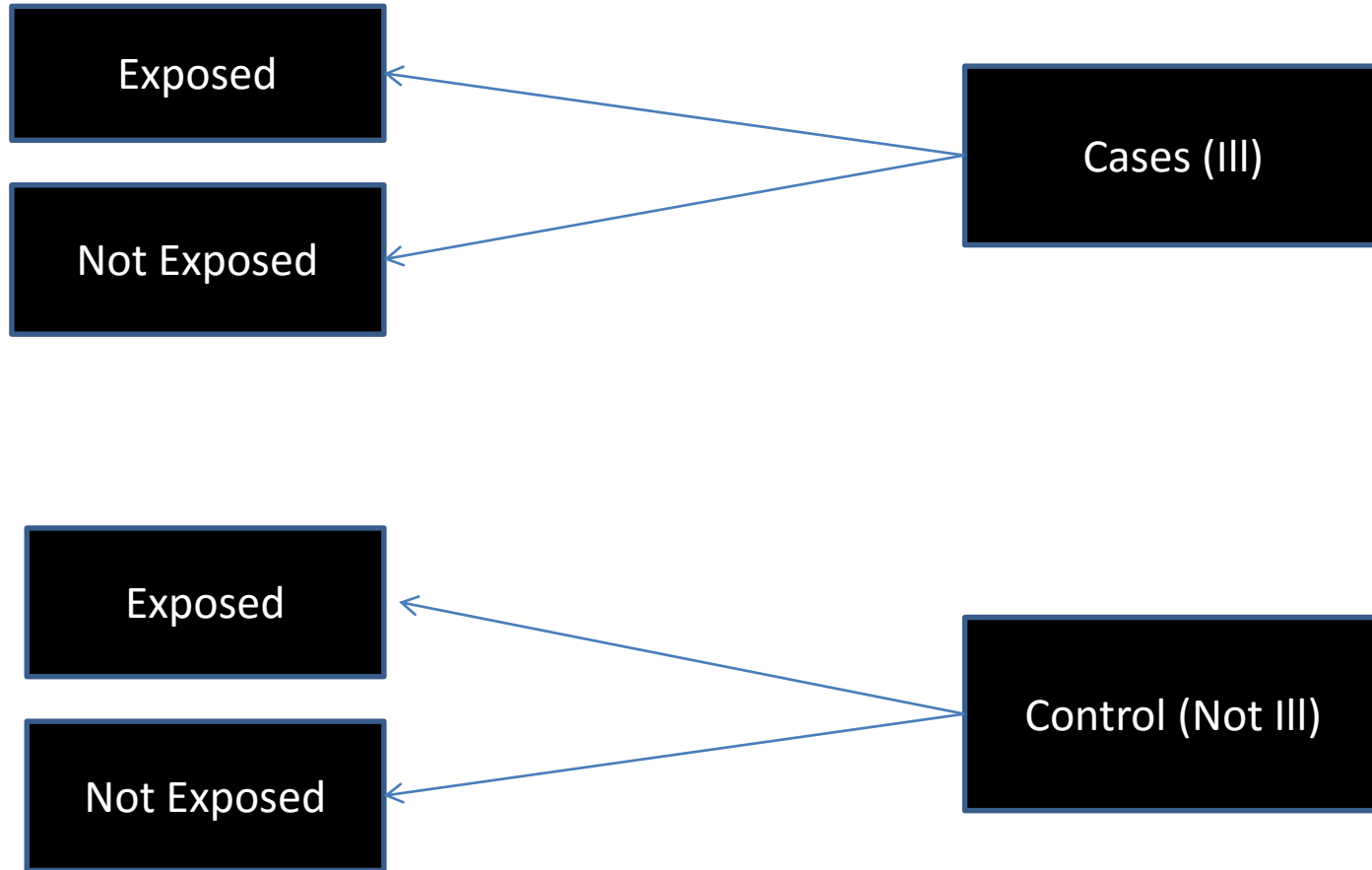


## Case Control Study

- 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 Study

The links below provide access to some examples of case control study:

- Teo KK, Ounpuu S, Hawken S, Pandey MR, Valentin V, Hunt D, Diaz R, Rashed W, Freeman R, Jiang L, Zhang X, Yusuf S, INTERHEART Study Investigators. Tobacco use and risk of myocardial infarction in 52 countries in the INTERHEART study: a case-control study. *Lancet*. 2006 Aug 19;368(9536):647-58. [doi: 10.1016/S0140-6736\(06\)69249-0](https://doi.org/10.1016/S0140-6736(06)69249-0)
- Inumaru LE, Irineu Gomes Duarte Quintanilha M, Aparecida da Silveira É, Veloso Naves MM. Risk and protective factors for breast cancer in Midwest of Brazil. *J Environ Public Health*. 2012;2012:356851. [doi: 10.1155/2012/356851](https://doi.org/10.1155/2012/356851)



## 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 Womens Health*. 2012;12:14. [doi: 10.1186/1472-6874-12-14](https://doi.org/10.1186/1472-6874-12-14)
- Udonwa NE, Ogbonna UK. Patient-related factors influencing satisfaction in the patient-doctor encounters at the general outpatient clinic of the university of Calabar teaching hospital, Calabar, Nigeria. *Int J Family Med*. 2012;2012:517027. [doi: 10.1155/2012/517027](https://doi.org/10.1155/2012/517027)



## References

- Aschengrau A, Seage GR. Essentials of Epidemiology in Public Health. Jones & Bartlett Publishers; 2008.
- Epidemiology Glossary | Data and Statistics | Reproductive Health | CDC. Available from: [http://www.cdc.gov/reproductivehealth/data\\_stats/glossary.html](http://www.cdc.gov/reproductivehealth/data_stats/glossary.html)
- Clinical Epidemiology Glossary. Evidence Based Medicine Toolkit. Available from: <http://www.ebm.med.ualberta.ca/Glossary.html>
- Gordis L. Epidemiology. Fourth edition. Saunders; 2008.