

# Experimental Epidemiology

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# Experimental Epidemiology

- Science of making predictions about individual patients by counting clinical events in similar patients, using strong scientific methods for studies of groups of patients to ensure that predictions are accurate
- Important approach to obtaining the kind of information clinicians need to make good decisions in the care of their patients
- Sounds like evidence based practice!

# Experimental Epidemiology

- In the 1920s, Experimental Epidemiology meant the study of epidemic colonies of experimental animals such as rats and mice. However, in modern usage, experimental epidemiology is often equated with Randomized Controlled Trials.
- Experimental or Interventional studies are similar in approach to cohort studies excepting that the conditions in which study is carried out are under the direct control of the investigator.

# Experimental Epidemiology

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1. Experimental epidemiology follows and builds on information gathered from descriptive and analytic approaches.
2. It is used to study epidemics, the etiology of human disease, the value of preventive and therapeutic measures, and the evaluation of health services.
3. In an experimental study, the investigator actually controls or changes the factors suspected of causing the health condition under study and observes what happens to the health state.
4. In human populations, experimental studies should focus on disease prevention or health promotion rather than testing the causes of disease, which is done primarily on animals.

Example on health promotion --> Vaccine

# Experimental Epidemiology

- An experiment is the best epidemiological study **design to prove causation.**
- It can be viewed as **the final or definitive step in the research process.**
- A mechanism for **confirming or rejecting the validity of ideas about the behaviours of objects, or effects upon them which result from interventions under defined sets of conditions.**

- 3 factors that are required to call the study Experimental :

- 1- manipulation
- 2- control
- 3- randomization

If there is cause and effect which we are not allowed to manipulate it , then we call this study --> Analytical

# Aims of Experimental Epidemiology

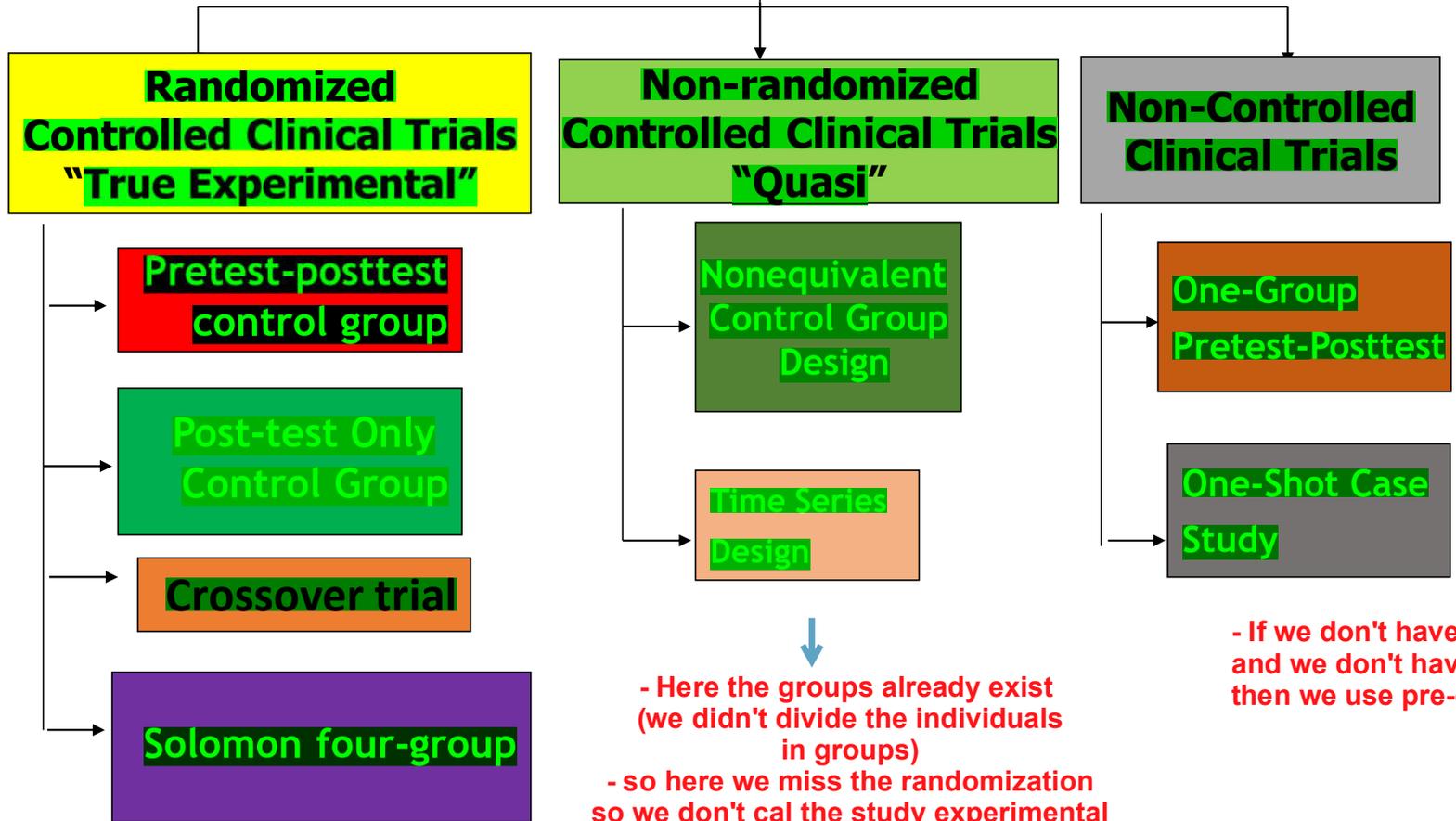
1. Provide stronger evidence of the effect (outcome) compared to observational designs, with maximum confidence and assurance.
2. To provide a method of measuring the effectiveness and efficiency of health services.
3. Yield more valid results, as variation is minimized and bias controlled
4. Determine whether experimental treatments are safe and effective under “controlled environments” (as opposed to “natural settings” in observational designs)

# Modern Clinical Trials in History

- Clinical trials began in 1800 onward to proliferate and more attention was paid to study design.
- Placebos were first used in 1863
- The idea of randomization was introduced in 1923. Deviding the samples into at least 2 groups and match the participants in the groups , so the groups must be homogenous.
- The first trial using properly randomized treatment and control groups also featured double blind assessment was carried out in 1948 by the Medical Research Council, and involved the use of streptomycin to treat pulmonary tuberculosis.

- if the sample contained animals --> Experimental
- If the sample contained humans --> Clinical
- If the sample contained any of them and we want to apply therapy --> interventional

# Clinical Trial Designs



- If we don't have randomization and we don't have control groups then we use pre-experimental

- Here the groups already exist  
(we didn't divide the individuals  
in groups)  
- so here we miss the randomization  
so we don't cal the study experimental