Basic concepts

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Objectives

- To define the basic concepts in statistics
- To understand the differences in between the variables

Definition of epidemiology

Study of the distribution and determinants (causes) of health-related states or events in specified human populations, and the application of this study to control of health problems.

Source :J.M. Last, A Dictionary of Epidemiology 2001

Clinical medicine

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INDIVIDUAL

- Target :
  - People **with** disease (patients)
- Actions :
  - Diagnostic
  - Treatment
- *Objective: Recover the patient health status*

Epidemiology

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GROUP OF PEOPLE

- Target :
  - People **with** disease
  - People **without** disease
- Actions:
  - Describe
  - Analyse
  - Evaluate
- *Objective: Control and prevention at community level*

Roles of epidemiology

- Describe: Observation
  - Knowledge: ***what, who, when, where***
  - Frequency of health status
  - Distribution of health status:gender age, race, geography…
  - Hypothesis
- Analyse: Comparing observed events
  - Analysis of risk factors
  - Understanding: ***why, how***
  - Proposal of prevention strategies
- Evaluate: Comparing controlled events
  - Measure efficacy of an action: new treatment, prevention strategy…

Statistics: Definition

Statistics is the science of collecting, organizing, **summarising, analysing,** and making inference from data

Descriptive stat.
collecting, organizing, summarising, analysing, and presenting data

Inferential stat.
Making inferences,
hypothesis testing
Determining relationship, and making prediction

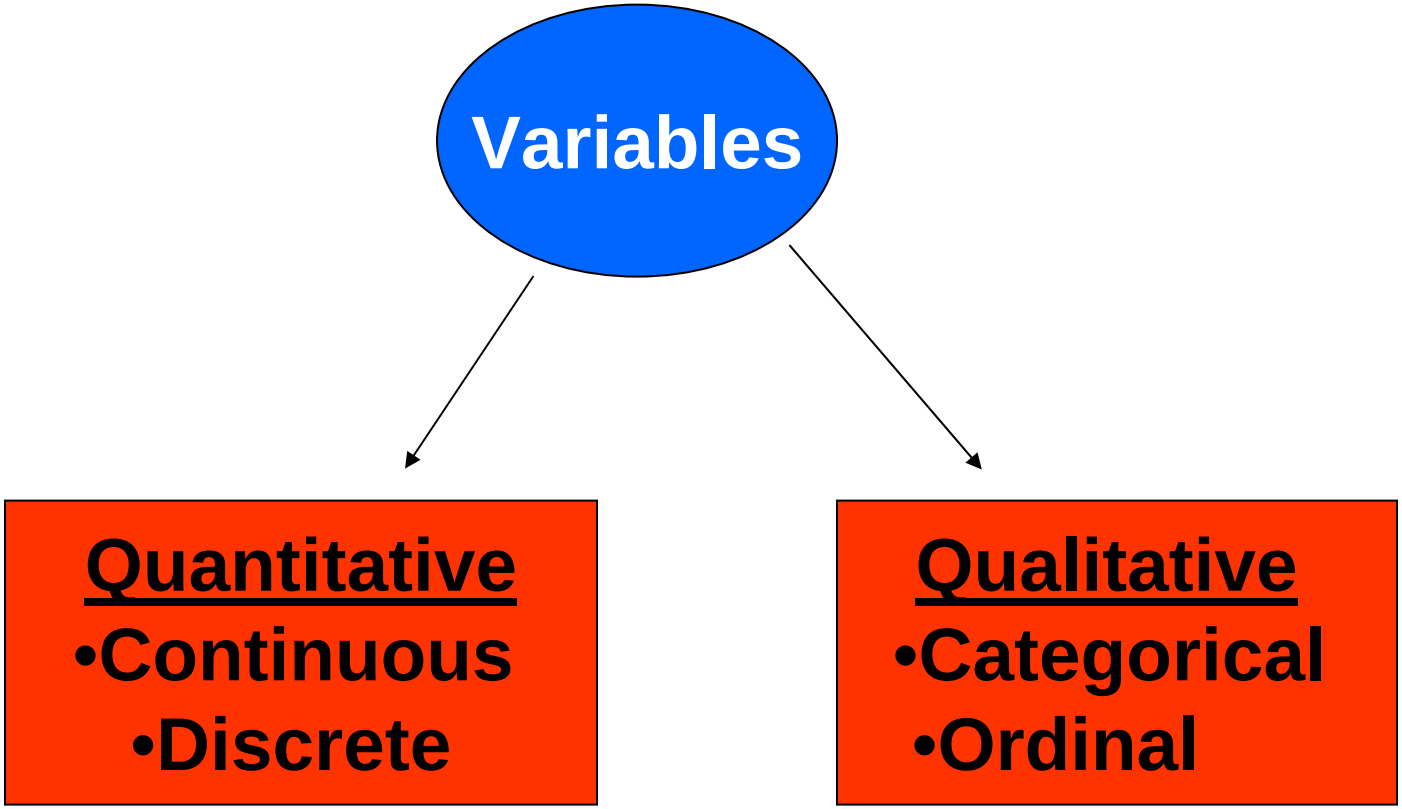
Descriptive epidemiology

Analytical epidemiology

Elementary Concepts

- Observational vs. experimental research.
  - In **observational research** we do not (or at least try not to) influence any variables but only measure them and look for relations (correlations) between some set of variables.
  - In **experimental research**, we manipulate some variables and then measure the effects of this manipulation on other variables.

- Variables:
  - Variables are things that we measure, control, or manipulate in research.
  - They differ in many respects, most notably in **the role** they are given in our research and in the **type of measures** that can be applied to them


Variables
Quantitative
•Continuous
•Discrete
Qualitative
•Categorical
•Ordinal

Types of Variables
Continuous Variables

- Numeric values with infinite number of values possible.

- Examples:
  - weight
  - temperature
  - blood pressure
  - time
- May be converted to categorical or ordinal

Types of Variables
Discrete Variables

- Numeric values with only certain values possible.
- Examples:
  - Epidemiological weeks
  - Number of children
- May be converted to categorical or ordinal

Types of Variables
Categorical Variables

- Organized into category
- No necessary order
- No quantitative measure
- Examples
  - male, female
  - race
  - marital status
  - treatment A and treatment B

Types of Variables
Ordinal variables

- Ranked or ordered
- Examples:
  - strongly agree, agree, disagree
  - worse, no change, better
  - 1st place, 2nd place, 3rd place