

Biostatistics

Lecture 1

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What is Statistics ?

- *Statistics* is a group of methods used to collect, analyze, present, and interpret data and to make decisions.

Examples of Some Statistics

- The number of educated people in AL-Baha City.
- The number of homeless in the United States of America.
- The number of cars in Saudi Arabia.
- The cost of health care services in Saudi Arabia

What is Bio-Statistics ?

- *Bio-Statistics* is a group of methods used to collect, analyze, present, and interpret of biological, medical, and public health data to make decisions.

Examples of Some Biostatistics Data

- The number of diagnostic tests in the hospital
- The number of hepatitis cases in the region
- The number of cancer deaths in Saudi Arabia.
- The number of infectious diseases in Saudi Arabia.

What are The Types of Statistics ?

Descriptive Statistics

Descriptive statistics consists of methods for organizing, displaying, and describing data by using tables, graphs, and summary measures

Example of Descriptive Statistics

- The test scores of students enrolled in a biostatistics class.
- In statistical terminology, the whole set of numbers that represents the scores of students is called a **data set**.
- The name of each student is called an **element**, and the score of each student is called an **observation**.

**Elements
Member**

Student's Name

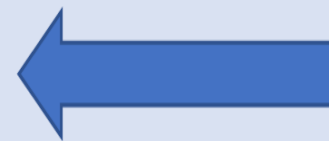
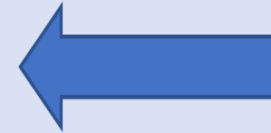
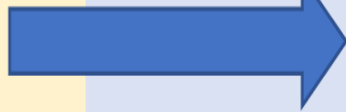
Ahmed
Ali
Saleh
Mohammed
Khalid

Scores

20
21
18
15
16

Variable

**Observation
Measurment**



In statistics, the collection of all elements of interest is called a **population**.

E.g. The number of all diabetic patients in AL-Baha City.

The selection of a few elements from this population is called a **sample**

**E.g. The number of diabetic patients in a primary health care
(A)**

Population / consists of all elements, individuals, items or objects whose characteristics are being studied

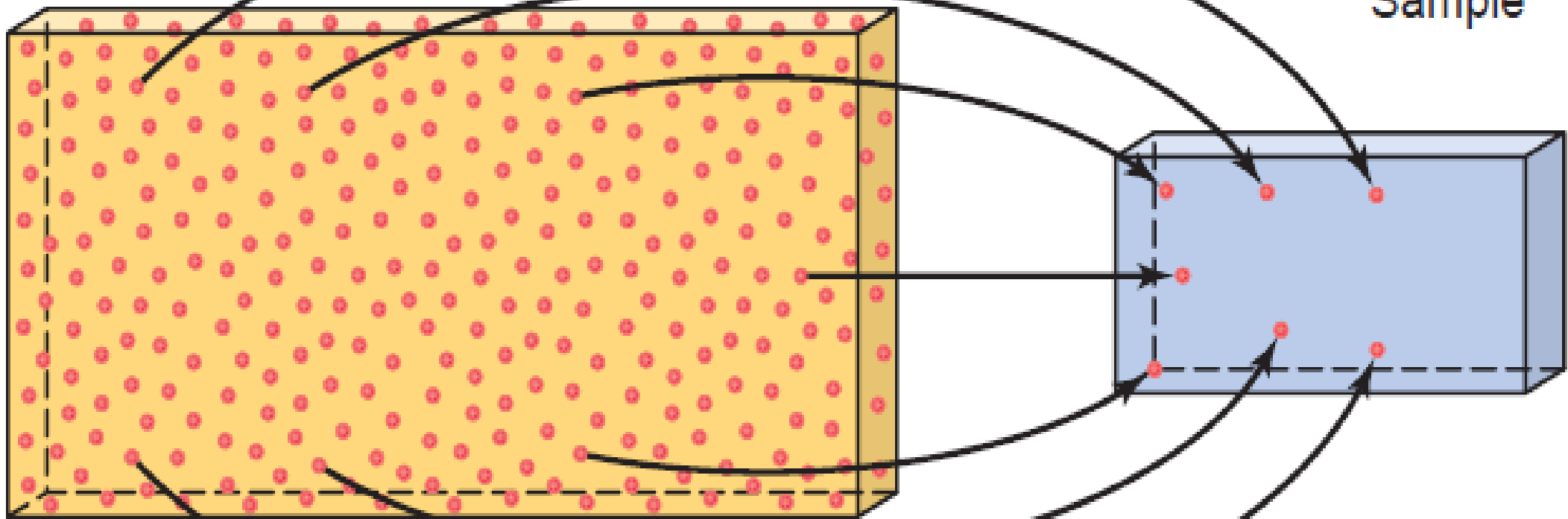
Sample / A portion of the population selected for study

Census / A survey that includes every member of the population.

Sample Survey / The technique of collecting information from a portion of population

Population

Sample



What are The Types of Statistics ?

Inferential Statistics

Inferential statistics consists of methods that use sample results to help make decisions or predictions about a population.

Example of Inferential Statistics

- The starting salary of a college graduate. We may select a sample of 1000 recent college graduates.
- Look at to the starting salaries to make a decision based on this information.

What is The Meaning of Variable ?

- It is a characteristic under study that assumes different values (scores of students in biostatistics) for different elements (students in college of applied health sciences)

What are The Types of Variables ?

- **Quantitative variables** / It can be measured numerically

Types of quantitative variables

1- Continuous variable / Any numerical values over a certain interval or intervals (Should has a decimal)

E.g. (Length, age, height, weight, time, and blood cholesterol)

What are The Types of Variables ?

- **2- Discrete variable** / Only a certain numerical values with no intermediate values (Never has a decimal).
- **E.g. (Number of cars, houses, and accidents)**

What are The Types of Variables ?

- **Qualitative variables** / It can not be measured numerically

Types of qualitative variables

1- Nominal variable / It is another name for a categorical variable

E.g. (Occupation, type of disease, type of cars)

What are The Types of Variables ?

2- Ordinal variables / They have ordered categories

E.g. (Severity of disease, socioeconomic class, level of education)

Low – Middle - High

Mild – Moderate - Severe

What are The Types of Variables ?

3- Binary variables / They have only two categories

E.g. (Gender : Male and Female)

Question answer (True, False)

Question (Yes, No)

	Gender (M/F)	Age	Weight (lbs.)	Height (in.)	Smoking (1=No, 2=Yes)	Race
Patient #1	M	59	175	69	1	White
Patient #2	F	67	140	62	2	Black
Patient #3	F	73	155	59	1	Asian

Experiment Variables

1- Independent variable/ Variables you manipulate in order to affect the outcome of an experiment.

E.g. (Salt : Blood Pressure)

(Sugar : Blood Glucose)

(Obesity : Blood Pressure : Blood Glucose)

Experiment Variables

2- Dependent variables / Variables that represent the outcome of the experiment.

3- Control variables / Variables that are held constant throughout the experiment. E.g. (Studying hours >>> Grade Point Average (GPA) >>> Intelligence Quotient (IQ)

Reference

- Prem S. Mann 1998, Introductory Statistics, 7th edn, New York, USA.

Good Luck for All Students

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