Lectures of Stat -145 (Biostatistics)

Text book

Biostatistics

Basic Concepts and Methodology for the Health Sciences

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Chapter 1

Introduction To Biostatistics

Text Book : Basic Concepts and Methodology for the Health Sciences

Key words :

- *Statistics , data , Biostatistics,*
- *Variable ,Population ,Sample*

Introduction
Some Basic concepts

Statistics is a field of study concerned with

1- collection, organization, summarization and analysis of data.

2- drawing of inferences about a body of data when only a part of the data is observed.

Statisticians try to interpret and communicate the results to others.

* Biostatistics:

The tools of statistics are employed in many fields:

business, education, psychology, agriculture, economics, ... etc.

When the data analyzed are derived from the biological science and medicine,

we use the term biostatistics to distinguish this particular application of statistical tools and concepts.

Data:

- The raw material of Statistics is data.
- We may define data as figures. Figures result from the process of counting or from taking a measurement.
- *For example:*
- - When a hospital administrator counts the number of patients (counting).
- - When a nurse weighs a patient (measurement)

* Sources of Data:

We search for suitable data to serve as the raw material for our investigation.

Such data are available from one or more of the following sources:

1- Routinely kept records.

For example:

- Hospital medical records contain immense amounts of information on patients.
- Hospital accounting records contain a wealth of data on the facility's business activities.

2- External sources.

The data needed to answer a question may already exist in the form of

published reports, commercially available data banks, or the research literature, i.e. someone else has already asked the same question.

3- Surveys:

The source may be a survey, if the data needed is about answering certain questions.

For example:

If the administrator of a clinic wishes to obtain information regarding the mode of transportation used by patients to visit the clinic,

then a survey may be conducted among patients to obtain this information.

4- Experiments.

Frequently the data needed to answer a question are available only as the result of an experiment.

For example:

If a nurse wishes to know which of several strategies is best for maximizing patient compliance,

she might conduct an experiment in which the different strategies of motivating compliance are tried with different patients.

* A variable:

It is a characteristic that takes on different values in different persons, places, or things.

For example:

- heart rate,
- the heights of adult males,
- the weights of preschool children,
- the ages of patients seen in a dental clinic.

Types of variables

- Quantitative
- Qualitative

Quantitative Variables

It can be measured in the usual sense.

For example:

- the heights of adult males,
- the weights of preschool children,
- the ages of patients seen in a
- dental clinic.

Qualitative Variables

Many characteristics are not capable of being measured. Some of them can be ordered or ranked.

For example:

- classification of people into socio-economic groups,
- social classes based on income, education, etc.

Types of quantitative variables

- Discrete
- Continuous

A discrete variable

is characterized by gaps or interruptions in the values that it can assume.

For example:

- The number of daily admissions to a general hospital,
- The number of decayed, missing or filled teeth per child in an elementary school.
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A continuous variable

can assume any value within a specified relevant interval of values assumed by the variable.

For example:

- Height,
- weight,
- skull circumference.

No matter how close together the observed heights of two people, we can find another person whose height falls somewhere in between.

* A population:

It is the largest collection of values of a random variable for which we have an interest at a particular time.

For example:

The weights of all the children enrolled in a certain elementary school.

Populations may be finite or infinite.

* A sample:

It is a part of a population.

For example:

The weights of only a fraction of these children.