

Motivating examples:

- ① who will win the next general election in India
- ② Investigate people's belief:
 - (a) Do you believe in life after death?
 - (b) Would you be willing to pay higher prices to protect environment?
 - (c) How much TV do you watch per day?

Inferential statistics:— The word infer means to arrive at a decision or prediction by reasoning from known evidence. Statistical inference does this using data as evidence.

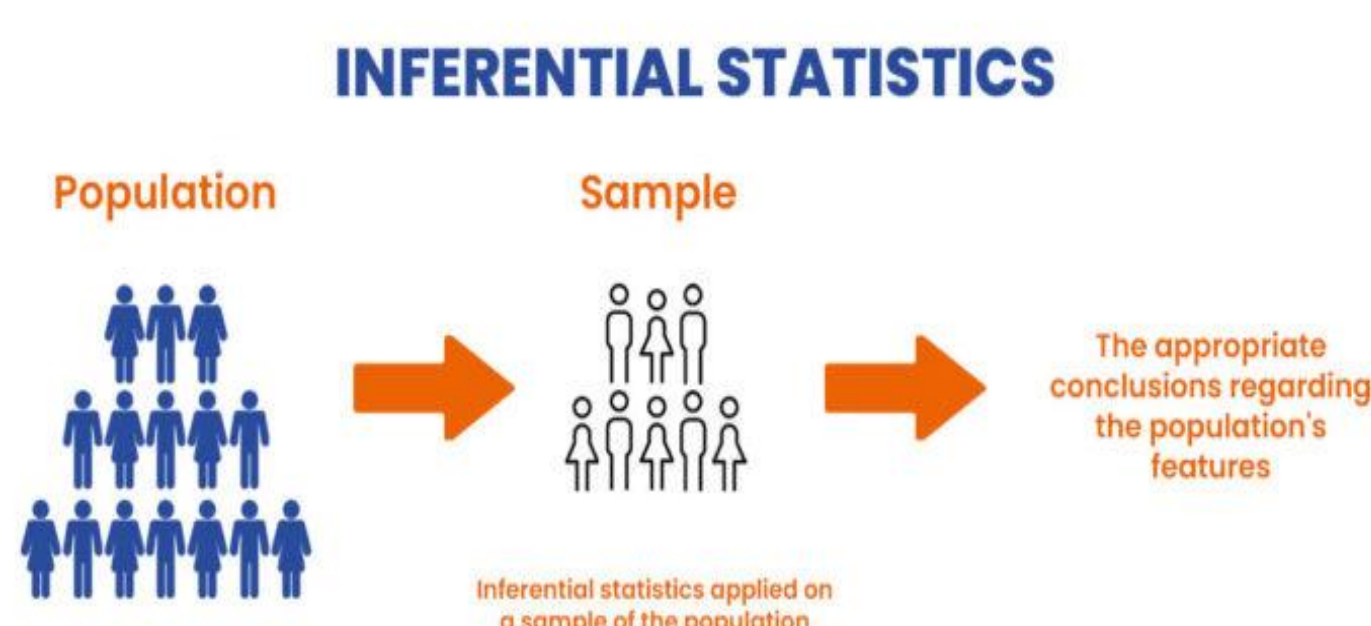
It is the process of generating conclusion about a population from sample(s) from the population.

Sample versus population:— population is a total

set of similar items or events which is of interest for some statistical question or experiment.

Example: All voter in India

A sample is a subset of the population for whom we have (or plan to have) data, often randomly selected.



How does inferential statistics answer a statistical question?

Let us consider a question

How likely is that 50% or more population think that Indian economy is getting worse.

Population: All voters in India, All graduates in economics in India etc.

To answer the above question, let us take a sample of 250 people. One can then take sample mean to arrive to a conclusion.

- ① Can we directly use this sample mean as the population mean?
- ② Will we be able to make 100% correct estimation? or we have to go with approximate value?

We can work this out in two ways

- ① We draw whole lot of samples of size 250. Take the average of the sample mean of the each sample.

Challenges: Since the population involves people, taking lots of samples may be difficult and costly. There is an element of uncertainty as how well the sample represents the population. The way the sample is taken matters.

- ② Other way to work out this problem is to use probability theory.

The second approach is widely popular. For this we need to understand the fundamentals of probability and random variable.