

What is probability sampling?

Definition: Probability sampling is defined as a sampling technique in which the researcher chooses samples from a larger population using a method based on the theory of probability. For a participant to be considered as a probability sample, he/she must be selected using a random selection.

The most critical requirement of probability sampling is that everyone in your population has a known and equal chance of getting selected. For example, if you have a population of 100 people, every person would have odds of 1 in 100 for getting selected. Probability sampling gives you the best chance to create a sample that is truly representative of the population.

Probability sampling uses statistical theory to randomly select a small group of people (sample) from an existing large population and then predict that all their responses will match the overall population.

What are the types of probability sampling?

Simple random sampling, as the name suggests, is an entirely random method of selecting the sample. This sampling method is as easy as assigning numbers to the individuals (sample) and then randomly choosing from those numbers through an automated process. Finally, the numbers that are chosen are the members that are included in the sample.

There are two ways in which researchers choose the samples in this method of sampling: The lottery system and using number generating software/ random number table. This sampling technique usually works around a large population and has its fair share of advantages and disadvantages.



Simple Random Sampling

Stratified random sampling involves a method where the researcher divides a more extensive population into smaller groups that usually don't overlap but represent the entire population. While sampling, organize these groups and then draw a sample from each group separately.

A standard method is to arrange or classify by sex, age, ethnicity, and similar ways. Splitting subjects into mutually exclusive groups and then using simple random sampling to choose members from groups.

Members of these groups should be distinct so that every member of all groups get equal opportunity to be selected using simple probability. This sampling method is also called "random quota sampling."



Stratified Random Sampling

Random cluster sampling is a way to select participants randomly that are spread out geographically. For example, if you wanted to choose 100 participants from the entire population of the U.S., it is likely impossible to

get a complete list of everyone. Instead, the researcher randomly selects areas (i.e., cities or counties) and randomly selects from within those boundaries.

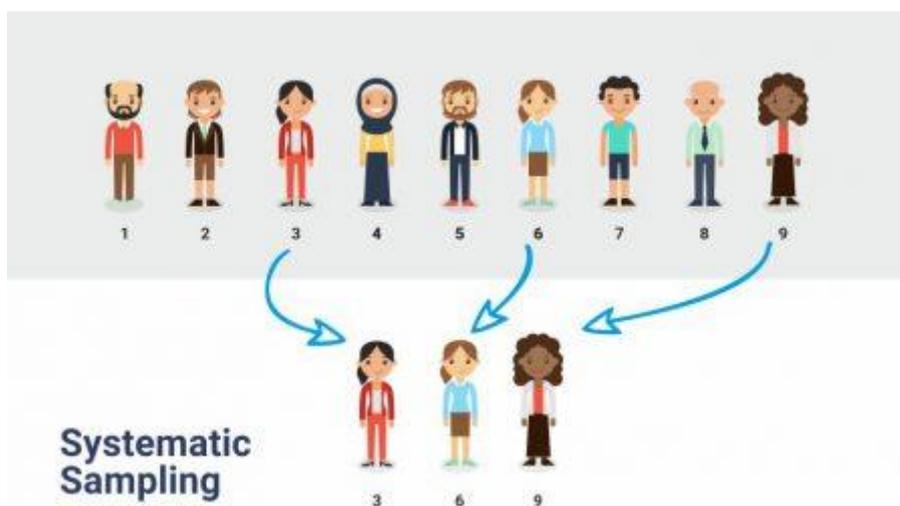
Cluster sampling usually analyzes a particular population in which the sample consists of more than a few elements, for example, city, family, university, etc. Researchers then select the clusters by dividing the population into various smaller sections.



Cluster Sampling

Systematic

sampling is when you choose every “nth” individual to be a part of the sample. For example, you can select every 5th person to be in the sample. Systematic sampling is an extended implementation of the same old probability technique in which each member of the group is selected at regular periods to form a **sample**. There’s an equal opportunity for every member of a population to be selected using this sampling technique.



Systematic Sampling

Example of probability sampling

Let us take an example to understand this sampling technique. The population of the US alone is 330 million. It is practically impossible to send a [survey](#) to every individual to gather information. Use probability sampling to collect data, even if you collect it from a smaller population.

For example, an organization has 500,000 employees sitting at different geographic locations. The organization wishes to make certain amendments in its human resource policy, but before they roll out the change, they want to know if the employees will be happy with the change or not. However, it's a tedious task to reach out to all 500,000 employees. This is where probability sampling comes handy. A sample from the larger population i.e., from 500,000 employees, is chosen. This sample will represent the population. Deploy a survey now to the sample.

From the responses received, management will now be able to know whether employees in that organization are happy or not about the amendment.

What are the steps involved in probability sampling?

Follow these steps to conduct probability sampling:

- 1. Choose your population of interest carefully:** Carefully think and choose from the population, people you believe whose opinions should be collected and then include them in the sample.
- 2. Determine a suitable sample frame:** Your frame should consist of a sample from your population of interest and no one from outside to collect accurate data.
- 3. Select your sample and start your survey:** It can sometimes be challenging to find the right sample and determine a suitable sample frame. Even if all factors are in your favor, there still might be unforeseen issues like cost factor, quality of respondents, and quickness to respond. Getting a sample to respond to a probability survey accurately might be difficult but not impossible.

But, in most cases, drawing a probability sample will save you time, money, and a lot of frustration. You probably can't send surveys to everyone, but you can always give everyone a chance to participate, this is what probability sample is all about.

When to use probability sampling?

Use probability sampling in these instances:

1. When you want to reduce the sampling bias: This sampling method is used when the bias has to be minimum. The selection of the sample largely determines the quality of the research's inference. How researchers select their sample largely determines the quality of a researcher's findings. Probability sampling leads to higher quality findings because it provides an unbiased representation of the population.

2. When the population is usually diverse: Researchers use this method extensively as it helps them create samples that fully represent the population. Say we want to find out how many people prefer medical tourism over getting treated in their own country. This sampling method will help pick samples from various socio-economic strata, background, etc. to represent the broader population.

3. To create an accurate sample: Probability sampling help researchers create accurate samples of their population. Researchers use proven statistical methods to draw a precise sample size to obtained well-defined data.

Advantages of probability sampling

Here are the advantages of probability sampling:

1. It's Cost-effective: This process is both cost and time effective, and a larger sample can also be chosen based on numbers assigned to the samples and then choosing random numbers from the more significant sample.

2. It's simple and straightforward: Probability sampling is an easy way of sampling as it does not involve a complicated process. It's quick and saves time. The time saved can thus be used to analyze the data and draw conclusions.

3. It is non-technical: This method of sampling doesn't require any technical knowledge because of its simplicity. It doesn't require intricate expertise and is not at all lengthy.

What is the difference between probability sampling and non-probability sampling?

Here's how you differentiate probability sampling from non-probability sampling,

Probability sampling	Non-probability sampling
The samples are randomly selected.	Samples are selected on the basis of the researcher's subjective judgment.
Everyone in the population has an equal chance of getting selected.	Not everyone has an equal chance to participate.
Researchers use this technique when they want to keep a tab on sampling bias.	Sampling bias is not a concern for the researcher.
Useful in an environment having a diverse population.	Useful in an environment that shares similar traits.
Used when the researcher wants to create accurate samples.	This method does not help in representing the population accurately.
Finding the correct audience is not simple.	Finding an audience is very simple.

What is non-probability sampling?

Definition: Non-probability sampling is defined as a sampling technique in which the researcher selects samples based on the subjective judgment of the researcher rather than random selection. It is a less stringent method. This sampling method depends heavily on the expertise of the researchers. It is carried out by observation, and researchers use it widely for [qualitative research](#).

Non-probability sampling is a sampling method in which not all members of the population have an equal chance of participating in the study, unlike probability sampling. Each member of the population has a known chance of being selected. Non-probability sampling is most useful for exploratory studies like a pilot survey (deploying a survey to a smaller sample compared to pre-determined sample size). Researchers use this method in studies where it is impossible to draw random probability sampling due to time or cost considerations.

Types of non-probability sampling

Here are the types of non-probability sampling methods:

- ***Convenience sampling:***

Convenience sampling is a non-probability sampling technique where samples are selected from the population only because they are conveniently available to the researcher. Researchers choose these samples just because they are easy to recruit, and the researcher did not consider selecting a sample that represents the entire population. Ideally, in research, it is good to test a sample that represents the population. But, in some research, the population is too large to examine and consider the entire population. It is one of the reasons why researchers rely on convenience sampling, which is the most common non-probability sampling method, because of its speed, cost-effectiveness, and ease of availability of the sample.

- ***Consecutive sampling:***

This non-probability sampling method is very similar to convenience sampling, with a slight variation. Here, the researcher picks a single person or a group of a sample, conducts research over a period, analyzes the results, and then moves on to another subject or group if needed.

Consecutive sampling technique gives the researcher a chance to work with many topics and fine-tune his/her research by collecting results that have vital insights.

- ***Quota sampling:***

Hypothetically consider, a researcher wants to study the career goals of male and female employees in an organization. There are 500 employees in the organization, also known as the population. To understand better about a population, the researcher will need only a sample, not the entire population. Further, the researcher is interested in particular strata within the population. Here is where quota sampling helps in dividing the population into strata or groups.

- ***Judgmental or Purposive sampling:***

In the judgmental sampling method, researchers select the samples based purely on the researcher's knowledge and credibility. In other words, researchers choose only those people who they deem fit to participate in the research study. Judgmental or purposive sampling is not a scientific method of sampling, and the downside to this sampling technique is that the preconceived notions of a researcher can influence the results. Thus, this research technique involves a high amount of ambiguity.

- ***Snowball sampling:***

Snowball sampling helps researchers find a sample when they are difficult to locate. Researchers use this technique when the sample size is small and not easily available. This sampling system works like the referral program. Once the researchers find suitable subjects, he asks them for assistance to seek similar subjects to form a considerably good size sample.

Non-probability sampling examples

Here are three simple examples of non-probability sampling to understand the subject better.

1. An example of convenience sampling would be using student volunteers known to the researcher. Researchers can send the survey to students belonging to a particular school, college, or university, and act as a sample.

2. In an organization, for studying the career goals of 500 employees, technically, the sample selected should have proportionate numbers of males and females. Which means there should be 250 males and 250 females. Since this is unlikely, the researcher selects the groups or strata using quota sampling.
3. Researchers also use this type of sampling to conduct research involving a particular illness in patients or a rare disease. Researchers can seek help from subjects to refer to other subjects suffering from the same ailment to form a subjective sample to carry out the study.

When to use non-probability sampling?

- Use this type of sampling to indicate if a particular trait or characteristic exists in a population.
- Researchers widely use the non-probability sampling method when they aim at conducting qualitative research, pilot studies, or exploratory research.
- Researchers use it when they have limited time to conduct research or have budget constraints.
- When the researcher needs to observe whether a particular issue needs in-depth analysis, he applies this method.
- Use it when you do not intend to generate results that will generalize the entire population.

Advantages of non-probability sampling

Here are the advantages of using the non-probability technique

- Non-probability sampling techniques are a more conducive and practical method for researchers deploying surveys in the real world. Although statisticians prefer probability sampling because it yields data in the form of numbers, however, if done correctly, it can produce similar if not the same quality of results.
- Getting responses using non-probability sampling is faster and more cost-effective than probability sampling because the sample is known to the researcher. The respondents respond quickly as compared to people randomly selected as they have a high motivation level to participate.

Difference between non-probability sampling and probability sampling:

Non-probability sampling	Probability sampling
Sample selection based on the subjective judgment of the researcher.	The sample is selected at random.
Not everyone has an equal chance to participate.	Everyone in the population has an equal chance of getting selected.
The researcher does not consider sampling bias.	Used when sampling bias has to be reduced.
Useful when the population has similar traits.	Useful when the population is diverse.
The sample does not accurately represent the population.	Used to create an accurate sample.
Finding respondents is easy.	Finding the right respondents is not easy.