What are sampling methods?

In a statistical study, sampling methods refer to how we select members from the population to be in the study.

If a sample isn't randomly selected, it will probably be biased in some way and the data may not be representative of the population.

There are many ways to select a sample—some good and some bad.

Bad ways to sample

Convenience sample: The researcher chooses a sample that is readily available in some non-random way.

Example— A researcher polls people as they walk by on the street.

Why it's probably biased: The location and time of day and other factors may produce a biased sample of people.

Voluntary response sample: The researcher puts out a request for members of a population to join the sample, and people decide whether or not to be in the sample.

Example— A TV show host asks his viewers to visit his website and respond to an online poll.

Why it's probably biased: People who take the time to respond tend to have similarly strong opinions compared to the rest of the population.

PRACTICE PROBLEM 1

A restaurant leaves comment cards on all of its tables and encourages customers to participate in a brief survey to learn about their overall experience.

What type of sampling is this?

A: Convenience sampling

B: Voluntary response sampling

Good ways to sample

Simple random sample: Every member and set of members has an equal chance of being included in the sample. Technology, random number generators, or some other sort of chance process is needed to get a simple random sample.

Example– A teachers puts students' names in a hat and chooses without looking to get a sample of students.

Why it's good: Random samples are usually fairly representative since they don't favor certain members.

Stratified random sample: The population is first split into groups. The overall sample consists of some members from every group. The members from each group are chosen randomly.

Example– A student council surveys 100 students by getting random samples of 25 freshers, 25 secondYear, 25 ThirdYear, and 25 FinalYear.

Why it's good: A stratified sample guarantees that members from each group will be represented in the sample, so this sampling method is good when we want some members from every group.

Cluster random sample: The population is first split into groups. The overall sample consists of every member from some of the groups. The groups are selected at random.

Example– An airline company wants to survey its customers one day, so they randomly select 5 flights that day and survey every passenger on those flights.

Why it's good: A cluster sample gets every member from some of the groups, so it's good when each group reflects the population as a whole.

Systematic random sample: Members of the population are put in some order. A starting point is selected at random, and every nth member is selected to be in the sample.

Example– A principal takes an alphabetized list of student names and picks a random starting point. Every 20th student is selected to take a survey.

PRACTICE PROBLEM 2

Each student at a school has a student identification number. Counselors have a computer generate 50 random identification numbers and those students are asked to take a survey.

What type of sampling is this?

A: Simple random sampling

B: Stratified random sampling

C: Cluster random sampling

D: Systematic random sampling