



Australian Bureau of Statistics

Statistical Language - Census and Sample



Census and Sample

Recommended: First read *What is a Population?*

Content on this page requires Adobe Flash Player to be viewed.

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Alternatively, read the transcripts, attached below, containing a text version of the information displayed in the Flash Animation.

This animation explains the concept of census and sample. If you are unable to access the video a Transcript (.doc 27kb) has been provided. The animation requires Adobe Flash Player to run. There is no audio in this animation.

How do we study a population?

A population may be studied using one of two approaches: taking a census, or selecting a sample.

It is important to note that whether a census or a sample is used, both provide information that can be used to draw conclusions about the whole population.

What is a census (complete enumeration)?

A **census** is a study of every unit, everyone or everything, in a population. It is known as a **complete enumeration**, which means a complete count.

What is a sample (partial enumeration)?

A **sample** is a subset of units in a population, selected to represent all units in a population of interest. It is a **partial enumeration** because it is a count from part of the population.

Information from the sampled units is used to estimate the characteristics for the entire population of interest.

When to use a census or a sample?

Once a population has been identified a decision needs to be made about whether taking a census or selecting a sample will be the more suitable option. There are advantages and disadvantages to using a census or sample to study a population:

Pros of a CENSUS	Cons of a CENSUS
<ul style="list-style-type: none"> provides a true measure of the population (no sampling error) benchmark data may be obtained for future studies detailed information about small sub-groups within the population is more likely to be available 	<ul style="list-style-type: none"> may be difficult to enumerate all units of the population within the available time higher costs, both in staff and monetary terms, than for a sample

	<ul style="list-style-type: none"> generally takes longer to collect, process, and release data than from a sample
Pros of a SAMPLE	Cons of a SAMPLE
<ul style="list-style-type: none"> costs would generally be lower than for a census results may be available in less time if good sampling techniques are used, the results can be very representative of the actual population 	<ul style="list-style-type: none"> data may not be representative of the total population, particularly where the sample size is small often not suitable for producing benchmark data as data are collected from a subset of units and inferences made about the whole population, the data are subject to 'sampling' error decreased number of units will reduce the detailed information available about sub-groups within a population

How are samples selected?

A sample must be robust in its design and large enough to provide a reliable representation of the whole population. Aspects to be considered when designing a sample include the level of accuracy required, cost, and the timing. Sampling can be random or non-random.

In a random (or probability) sample each unit in the population has a chance of being selected, and this probability can be accurately determined.

Probability or random sampling includes, but is not limited to, simple random sampling, systematic sampling, and stratified sampling. Random sampling makes it possible to produce population estimates from the data obtained from the units included in the sample.

Simple random sample: All members of the sample are chosen at random and have the same chance of being in the sample. A lottery draw is a good example of simple random sampling where the numbers are randomly generated from a defined range of numbers (i.e. 1 through to 45) with each number having an equal chance of being selected.

Systematic random sample: The first member of the sample is chosen at random then the other members of the sample are taken at intervals (i.e. every 4th unit).

Stratified random sample: Relevant subgroups from within the population are identified and random samples are selected from within each strata.

In a non-random (or non-probability) sample some units of the population have no chance of selection, the selection is non-random, or the probability of their selection can not be determined.

In this method the sampling error cannot be estimated, making it difficult to infer population estimates from the sample. Non-random sampling includes convenience sampling, purposive sampling, quota sampling, and volunteer sampling

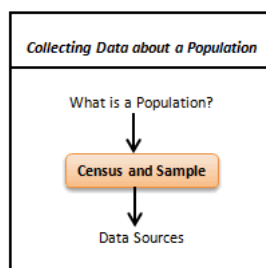
Convenience sampling: Units are chosen based on their ease of access;

Purposive sampling: The sample is chosen based on what the researcher thinks is appropriate for the study;

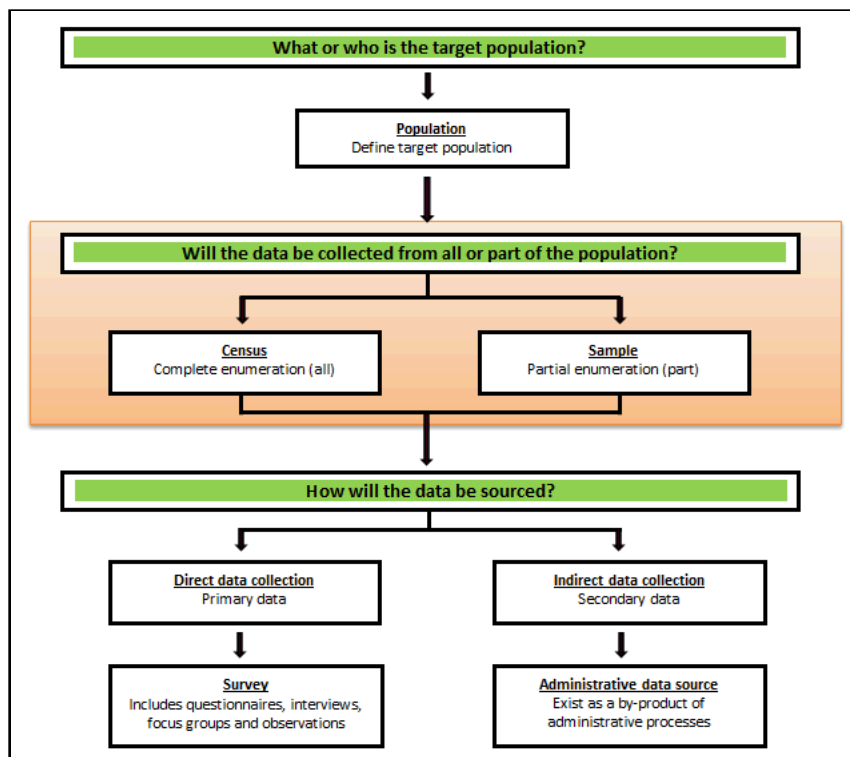
Quota sampling: The researcher can select units as they choose, as long as they reach a defined quota; and

Volunteer sampling: participants volunteer to be a part of the survey (a common method used for internet based opinion surveys where there is no control over how many or who votes).

Collecting data about a population flowchart:



Collecting Data about a Population Flowchart: Census and Sample



Recommended: [Read Data Sources next](#)

Further information:

ABS:
1299.0 - An Introduction to Sample Surveys: A User's Guide

External links:
[Sample Size calculator](#)
[Basic Survey Design: Samples and Censuses](#)

[Return to Statistical Language Homepage](#)

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