

# Factsheet: Sampling and Testing

## Introduction

Sampling and testing are an integral component of the audit engagement process.

An auditor will generally design a 'sampling and testing plan' for each audit engagement to determine how the audit will achieve its objective by confirming or otherwise the validity of assertions that are key to the audit.

Not every audit engagement will necessarily include sampling and testing – some audit topics will not include transaction or data sampling and testing procedures. Sometimes it will be about whether controls are in place and analysing their design and operating effectiveness.

## What is Sampling?

Selecting a sample allows conclusions to be reached about an entire population on analysis of a portion (less than 100%) of the sample.

Audit sampling applies an audit procedure to fewer than 100% of the items being audited for the purpose of drawing an inference about a characteristic of the population – the population contains all items to be considered for testing. Each must have known and non-zero chance of selection to ensure the results can be projected to the population. The easiest form of sampling is where every item in the population has the same chance of selection. For large populations containing thousands of items, population size will cause little impact on total sample size and is often irrelevant for audit sample planning.

## What is Testing?

Testing is taking a selected sample and assessing its individual components to determine whether they achieve the expected objective.

## What are Testing Techniques?

**Compliance testing** is an approach to determine whether prescribed controls actually exist and are being complied with in practice. In systems-based audit methodology, an audit attempts to establish how a system is operating by using a model of the way it operates and then confirming that model by testing transactions for adherence to the model. This is called compliance testing.

**Substantive testing** is an approach for determining whether data includes a material amount of error usually by sampling selected transactions, accounts or activities. Usually this is testing of dollar amounts, but any value can be tested. Testing which determines whether data includes a material amount of dollar-errors is termed substantive testing. External auditors are major users of substantive testing.

## What are Testing Methods?

There are various methods that can be used for audit testing:

- › Analytical Review
- › Confirmation and Representation
- › Data Analysis and Exception Tests
- › Data Analytics
- › Documentation Review
- › Facilitated Meetings
- › Interviewing
- › Observation and Inspection
- › Process Mapping
- › Questioning
- › Recalculation and Valuation
- › Reconciliation
- › Scanning
- › Surveys
- › Vouching and Verifying
- › Walkthrough

Each have their own advantages and disadvantages which are beyond the scope of this Factsheet. This Factsheet considers only testing of population items.

## What are Audit Test Types?

**Judgemental (non-statistical) sampling** is a subjective approach to determining sample size and selection. Based on other work, it may be possible to test the most significant and / or risky transactions and to emphasise the types of transactions subject to high control risk.

**Statistical (random) sampling** is an objective method of determining sample size and selecting the items to be examined. Unlike judgemental sampling, it provides a means of quantitatively assessing reliability or confidence level – the probability the sample will represent the population.

Many auditors choose to use judgemental sampling, but this is unlikely to provide as good a result as statistical sampling.

Regardless of the sampling approach used, professional auditor judgment must govern the quality of audit evidence. Even with statistical sampling, auditors must exercise judgement in determining appropriate statistical parameters to use for a valid audit conclusion. Nonetheless, a statistical approach to evidence gathering will normally provide a more objective basis for evaluating sample results than a non-statistical judgemental technique. This enhances the quality of audit reporting.

## Attribute Sampling

Attribute sampling is a statistical sampling method used to obtain information for estimating:

- › Whether (Yes or No) an event (the attribute) has occurred.
- › The total number of times (how many) an event occurred.
- › The frequency (how often) an event occurred throughout the population.

Attribute sampling tests the effectiveness of controls because it can estimate a rate of occurrence of control deviations.

Attribute sampling represents the most common statistical application used by auditors to test effectiveness of controls and determine the rate of compliance with established criteria. Results of attribute sampling provide a statistical basis for the auditor to conclude whether the controls are functioning as intended, reflecting either control compliance or non-compliance – Yes or No.

In developing an attribute sampling plan, the auditor must first define:

- › The audit test objective.
- › Population involved.
- › Sampling unit.
- › Control items to be tested.

For example, if the auditor's objective is to determine the percentage of purchases lacking approval, the population will consist of all purchases within a given period. Each purchase becomes the sampling unit and purchase approval represents the control attribute to be tested.

The auditor must consider four statistical parameters to determine an appropriate sample size to select for the planned control test:

- › Confidence level.
- › Expected deviation rate.
- › Tolerable rate.
- › Population.

Although guided by assessed risk, enquiries of the audit sponsor (the person subject to audit) and prior audit experience, each parameter is ultimately based on professional auditor judgment.

### Confidence Level

The sample's confidence level refers to the reliability the auditor places on the sample results. Confidence levels of 90% to 99% are common. A 95% confidence level means the auditor assumes the risk that 5 out of 100 samples will not reflect the true values in the population.

The auditor's assessment of the control environment contributes to the level of risk the auditor is willing to assume. At a 95% confidence level, 5% reflects the auditor's risk of 'assessing control risk too low'.

### Expected Deviation Rate

The expected deviation rate represents the auditor's best estimate of the actual failure rate of a control in a population. The rate is usually based on audit sponsor enquiries, changes in personnel, process observations, prior year test results, or even the results of a preliminary sample.

### Tolerable Rate

The tolerable rate defines the maximum rate of non-compliance the auditor will 'tolerate' and still rely on the prescribed control. Many auditors will co-ordinate with their audit sponsor before establishing a tolerable rate. Audit sponsor control objectives help determine the nature and frequency of deviations that can occur and still allow reliance on the control.

### Population

The population contains all items to be considered for testing. Each must have a known and non-zero chance of selection to ensure the final sample result can be projected across the population. For large populations containing thousands of items, population size will cause little impact on total sample size and is often irrelevant for audit sample planning.

Data analytic techniques should be considered for every internal audit engagement where the data population warrants it. While not every internal audit engagement will require the use of data analytic techniques, the 'International Standards for the Professional Practice of Internal Auditing' issued by the Institute of Internal Auditors indicate that due professional care requires the use of such techniques wherever appropriate.

The following table is often used to validate the auditor's assessment of controls and a random sample is selected according to the number of items in the population. It is a rule-of-thumb test that is always used in conjunction with other information.

If the population has this many members	choose a sample of this size
1	1
4	2
12–50	4
50–300	10% (ie 5 to 30)
More than 300	30

## Conclusion

Audit sampling is a useful tool for application in the testing of systems and processes. Statistical sampling is one approach that allows conclusions about an entire population to be drawn from analysis of a portion of it.

Best practice is to use the testing technique that best suits the problem to be solved:

- › Data analysis techniques – where the data is in a suitable form.
- › Statistical sampling – to enable projection of tests across a population.
- › Non-statistical (judgemental) sampling – to obtain examples.

## Acknowledgement

The content of this Factsheet has been informed by information provided by Michael Parkinson in Adelaide, Australia.

## Helpful References

Factsheet '*Data Analytics and Continuous Control Monitoring*', IIA-Australia

Factsheet '*Data Analytics Planning*', IIA-Australia

White Paper '*Internal Audit Sampling*', IIA-Australia

*'Internal Audit in Australia – second edition*', IIA-Australia

*'International Professional Practices Framework*'; IIA Global

*'Team Leader's Guide to Internal Audit Leadership*', Internal Audit Foundation

