

# General Overview

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## Types of samples

- Audit every item: Equal Complete Coverage
- Statistical Sample: Probability Sample
- Non-statistical sample: Block; Judgment

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## Probability Sample

- A probability sample assigns each unit a known chance of being selected
- Provides objective measure of difference between sample result and result of equal complete coverage
- Usefulness may depend on the magnitude of this difference

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## Minimum requirements

- Target population carefully defined
- Appropriate frame and sampling units
- Sampling units auditable
- A valid sample design
- Sound statistical estimator
- Adequate documentation

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## Frame

- File of auditable sampling units
- Completeness
- Treatment of extraneous units

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## Some sample designs

- Simple random sample
- Stratified random sample
- Cluster sample
- Multistage sample
- Probability Proportional to Size (PPS) sample

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## Important distributions

- Recorded amounts (sales, purchases)
- Error amounts (recorded amounts incorrectly classified)
- Sampling distribution of estimated total error

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## Properties of sampling distribution

- Mean equals actual total error ( or reasonably close)
- Standard deviation called standard error
- Standard error measures variability of sample estimates
- May approximate a normal distribution

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## Confidence Interval (Approximate normality)

- Estimate represents an observation from the sampling distribution
- Probability of any specified distance between estimate and mean can be calculated
- Distance measured as multiple of the standard error (sampling error or precision)
- For specified multiple, can determine probability (confidence)

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## One sided or two sided

- Can determine the distance either above the estimate or below the estimate or both
- Upper confidence limit tells how large the total error might be
- Lower confidence interval tells how small the total error might be
- Using upper and lower provides an interval

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## Example

- Sample estimate equals \$1,000,000
- Standard error equals \$50,000
- One-sided confidence level is 95%, multiple equal 1.65
- Sampling error (precision) equals \$82,500
- Confidence that the distance above \$1,000,000 is smaller than \$82,500 is 95% (upper confidence limit equals \$1,082,500)
- Confidence that distance below \$1,000,000 is smaller than \$82,500 is 95%
- Confidence that distance is smaller than \$82,500 in either direction is 90%

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## Sampling risk

- Sampling risk is the chance that the confidence limit or the confidence interval does not contain the total error
- Sampling risk is 1 minus the confidence level.
- In above example, the sampling risk is 5% for each one-sided limit and 10% for the interval

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