Sampling Techniques That Work for Public Sector Auditors
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Session Objectives

- Understand basics of probability and non-probability sampling
- Become aware of the range of samples that work well for public sector auditing
- To know how, when and why to use various sampling techniques on audits
- To review a sampling case study and draw implications to public sector audits
Purpose of Sampling in Governmental Auditing

- Application of an audit procedure to less than 100% of items within a class or account balance for the purpose of evaluating some characteristics of that class or balance.
Comparing Financial and Performance Sampling Techniques

- **Financial**
  - To provide assurance that the financial statements are not materially misstated
    - Performance materiality
    - Tolerable misstatement

- **Performance**
  - To support conclusions of findings made as a result of the audit.
  - Risk of drawing false conclusion
  - No direct guidance or clear audit standards
Performance Materiality

- Performance materiality means
  - the amount or amounts set by the auditor at less than materiality for the financial statements as a whole to reduce to an appropriately low level the probability that the aggregate of uncorrected and undetected misstatements exceeds materiality for the financial statements as a whole.
  - If applicable, performance materiality also refers to the amount or amounts set by the auditor at less than the materiality level or levels for particular classes of transactions, account balances, or disclosures.
  - Performance materiality is similar to tolerable misstatement; however, tolerable misstatement is associated with sampling only. (AU 320.09)
Examples of Sampling from Public Sector Audits

- Validate data bases, reports
- Compliance tests
- Substantive tests on reasonableness of balances
- Establish rates of occurrence in the population
- Establish total dollars in the population
Adapting Sampling Theory for Auditing

- Does not have to be statistical
- Can accept risk at fairly high levels
- Can accept likelihood of error
- Confidence levels adjusted for variance and unknown populations
- Sample sizes are smaller
- Statements meet performance materiality
Probability Theory/Sampling Distributions

- Why small samples work
- Example of sampling distribution
Sampling Techniques that work:

1. Ask what kind of sample do I need?

- **Probability**: when generalization is required
  - Estimate total dollars in population
  - Estimate total errors

- **Non-probability**: when generalization is not required
  - Validation
  - Compliance
2. Know the unit of analysis

- Sampling units—what are you sampling: item, dollar, event, individual, case, team, day, hour, complaint, etc.?
- What is the question you are asking and what unit will best answer it?
3. Know the population

- Estimate population if exact population is not available
- Risk and confidence = prior knowledge
  - Best practice is for the auditor to consider all special knowledge about the items constituting the class prior to designing the sample AICPA 2.31.

- Estimate completeness
  - 3 steps (external; internal-2 way)
4. Determine what type of sample will work best

- Representativeness
- Randomness
- Risk of making an error-drawing the wrong conclusion
- Probability or non-probability
Probability Sampling

Types of Probability Samples

A. Attribute sampling
B. Acceptance sampling
C. Discovery sampling
D. Variable sampling
E. Work sampling
   • Random or predetermined
   • Extended cycle analysis
   • Fractioned professional estimates
A/B: Attributes/Acceptance

Sampling

- Attributes and Acceptance
  - Calculate maximum number of acceptable errors based on probability tables.
  - Short-cut: “stop-n-go”
  - Examples: files; data fields; compliance tests; lots
C: Discovery Sampling

- Discovery Sampling
  - used to explore a population
  - Small samples
  - Big risk, low confidence
  - Perfect for preliminary survey
  - Poor for fraud test
  - Must be added to during fieldwork
D: Variable Sampling

- Variable Sampling
  - Used for substantive audit tests
  - Establishes valid estimates
  - Examples: dollars lost to inefficiencies; cars left unutilized; overpayments to school districts; wait time; consumer spending at the state fair
  - Requires big sample and well-conceived sampling strategy to minimize bias
  - Case review: Arizona MVD wait time
E: Work Sampling

- Work Sampling
  - Random evaluation of time periods to assess compliance with work requirements or standards (efficiencies); assess delays
  - Predetermined evaluation of time periods to help set standards, e.g. peak times
  - Extended cycle analysis-sample all or part of the life cycle of a process through controlled reporting by professionals; uses time logs or ladders
  - Fractioned professional estimates: sampling various professionals on how they do a part or fraction of the process and relying on their estimates of how long it takes
  - Example: Arizona wait times for authorizing unemployment insurance via phone-combination method (random, predetermined, fractioned)
Common Errors in Attribute/Variable Sampling

- Sample too small
- Sample biased
- Generalize on the wrong basis
5. “Design on a dime”

- Sample should optimize budget **and** ability to conclude so select carefully:
  A. Random
  B. Systematic
  C. Stratified
  D. Cluster
  E. Multi-stage
  F. PPS
  G. Combinations
Sampling Designs

A. Random-uses a random number generator, a random start

B. Systematic-uses a random start when data are ordered. Sample every “nth” item. Keep cycling through the data until you complete sample. Can be done with a computer for electronic data or a ruler for hard files.
Sampling Designs

C. Stratified - uses “cuts”, “layers” or “strata” to minimize variation (and risk) in the sample, e.g. school district size

D. Cluster - exploits data that naturally occurs in a clustered form such as school districts (district, school, classroom)
Sampling Designs

E. Multistage- samples at various stages in the process, e.g. contract bidding and contractor selection

F. PPS – probability proportionate to size (also known as dollar unit sampling) - break each transaction into single dollar units and sample over the dollar units to maximize likelihood of capturing large dollar transactions.
Sampling Designs

G. Combinations-effective joining of two or more sample types to minimize risk and variation, e.g. combine school district strata–sample over small medium and large school districts, by type (unified, elementary, union, high school) and clusters-by school, classroom and teacher within a district)
Sample Designs: Helpful Hints

- When electronic data is not available: bring a ruler
- When probability sampling is required: plan on assigning enough audit budget to know your population
- Let risk be your guide
6. Determine the sample size: key steps

- Set risk and sample precision
- Set Confidence level
- Evaluate Variance
- Keep it simple
7. Consider Non-Probability Sampling

A. Risk-based
B. Convenience
C. Judgmental
D. Snowball
E. Quota
Non-Probability Samples

A. Risk-based/materiality based
   - Uses highest risk items such as worst offenders; most frequent users

B. Convenience
   - Uses what is convenient such as closest behavioral health centers or schools

C. Snowball
   - Uses one item to access another such as using a school district employee to sample a third party
Non-Probability Samples continued

D. Quota
- Uses a pre-specified amount and stops such as open versus closed cases

E. Judgmental
- Uses auditor judgment to select sample such as “Western States”; simply requires thought and adequate documentation.
8. Learn from experience

- Ask people who know
- Be creative
- Be confident
Capstone exercise

- Small group exercise-911 calls response time
- Develop at least two sampling strategies
- Critique strategies
- Select one
- Share final sampling decision with class
Finally…

- Case Study
- Troubleshooting your own audit work
Thank you!

- Contact information:
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- Linked-in groups
  - AGA
  - ALGA
  - IIA
  - ICPA-International Center for Performance Auditors
  - NCSL
  - NASACT