Strafford

Presenting a live 90-minute webinar with interactive Q&A

Medicare and Medicaid Audit Sampling Strategies

Creating Sampling Plans and Challenging Flawed CMS Audit Samples

THURSDAY, JULY 7, 2011

1pm Eastern | 12pm Central | 11am Mountain | 10am Pacific

Today's faculty features:

Patricia L. Maykuth, Ph.D, President, **Research Design Associates**, Decatur, Ga.

Edward M. Roche, Ph.D., J.D., Director of Scientific Intelligence, **Barraclough Ltd.**, New York

The audio portion of the conference may be accessed via the telephone or by using your computer's speakers. Please refer to the instructions emailed to registrants for additional information. If you have any questions, please contact **Customer Service at 1-800-926-7926 ext. 10**.

Notes to Accompany Stafford Publishing Co webinar:
Medicare and Medicaid Audit Sampling Strategies

Thursday, July 7, 2011

Slide 9

Numbers can readily be manipulated and outcomes understood through the use of simple math: addition, subtraction, multiplication, multiplication and division e.g., %s, differences, sums and averages.
Statistics is branch of applied math concerned with the collection and interpretation of quantitative data and the use of probability theory to estimate universe parameters e.g. correlations, *t*-tests and point estimates

INFERENTIAL STATISTICS is branch of applied statistics drawing conclusions about a population from a random sample drawn from it. These mathematical analyses move beyond mere description of research data to make inferences about the larger population from which the sample was drawn. This branch of applied statistics is used to drawing conclusions about a population from a random sample drawn from it. Allow projection of overpayment.

Slide 12

Common CMS statistical terms
Universe: all billing in target timeframe
Sampling unit – the unit of measurement for the study (in this case - claim)
Claim: either Claim, all lines of data billed for one patient on a given day or claim, a single line of data. The auditor must stick with the chosen unit & not switch back and forth
Frame: selected parts of the universe used in entirety. (All Claims for the 5 CPT codes chosen)
Parametric tests make specific assumptions about the population parameters that characterize the underlying distributions for that test
Non parametric tests make few or no assumptions about the underlying distribution of the and parameters of the population
Sample: randomly chosen set of claims
Overpayment: calculation and extrapolation
RAT-STATS – DHHS provided statistical package to calculate sample size, random number table, and appraisals (point estimates).

Slide 13 -14 Stat Terms

Error terms

- **Variance** - distance between each set of data points and their mean
- **Standard deviation** – square root of the variance
- **Precision** - accuracy of measurement, closeness to true value
- **Precision %** - one measure of CoV
- **Coefficient of Variation** - normalized measure of dispersion of the probability distribution or relative standard error
- **Error rate** –proportion of claims in error
- **Confidence Interval** - likelihood that chose the right claims & projection is accurate **SLIDE 15 Precision and lower bounds**
- **Sampling error** –discrepancy between the value of a statistic and the parameter it estimates

Mean (average) the arithmetic sum of all scores divided by the number of cases

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Median – the middle most real score in the data set
Mode the score that occurs most frequently in the data set (does not have to be unique – sometimes more than 1 value is equally likely)
Measures of variability
Parameter refers to a DISTRIBUTIONAL characteristic of a population

- **Parametric Statistics** are probability estimates based on the parameters of a normal distribution. Parametric tests make specific assumptions about the population parameters that characterize the underlying distributions for that test
- **Non Parametric Statistics** tests make few or no assumptions about the underlying distribution of the and parameters of the population

Point Estimate uses sample data to calculate a single point which serves as the best estimate of a universe parameter. **Slide 16**
Statistic refers to a characteristic of a sample, descriptive or inferential

Slide 18-21
A sample chosen from independent observations that are randomly selected from a normally distributed universe to yield a representative set of observations.
The sample must be large enough to reflect the statistical characteristics of the universe
The result is that each selected observation is equally likely to be selected as any other observation yielding an unbiased set of observations for drawing inferences about unknown characteristics of the universe

A **simple random sample** is selected so that all samples of the same size have an equal chance of being selected from the population. Sometimes within a universe there are groupings of similar data that can be divided into sub categories. **Stratified sampling** involves selecting independent samples from a number of subpopulations, group or strata within the population. Great gains in efficiency are sometimes possible from judicious stratification. This results in reduced error rates and small sample sizes which can efficiently and accurately represent the universe groupings.

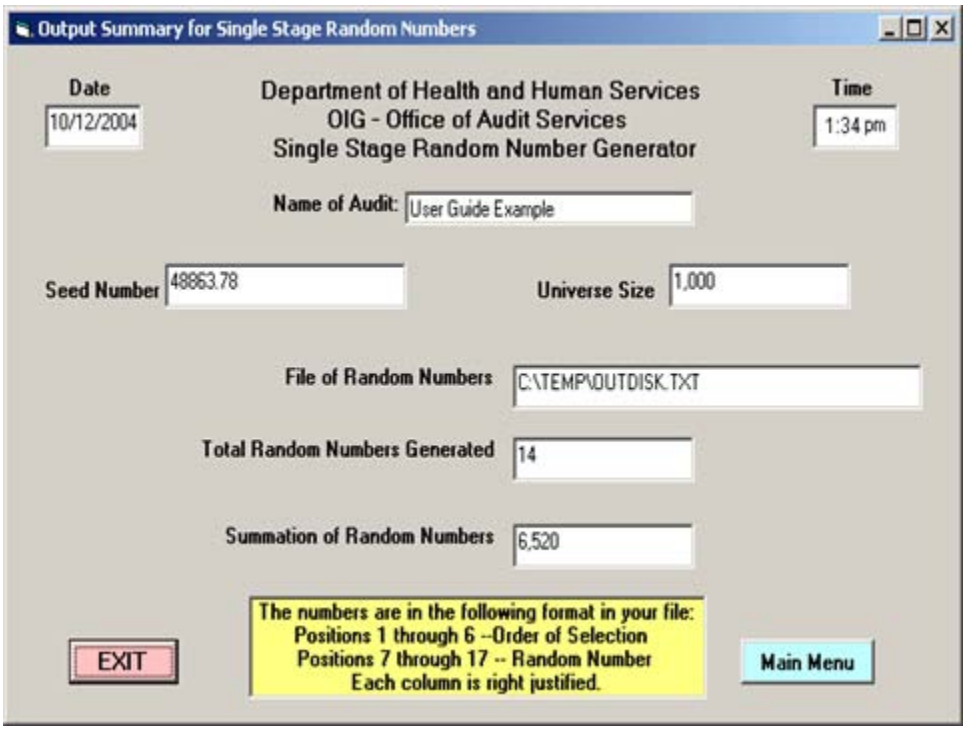
A **probability sampling** scheme is one in which every unit in the population has a chance (greater than zero) of being selected in the sample, and this probability can be accurately determined. The combination of these traits makes it possible to produce unbiased estimates of population totals, by weighting sampled units according to their probability of selection.

When the probability of a claim's occurrence it the universe is known, the claim is weighted in accordance to its probability of selection. Therefore, what makes it a probability sample is the fact that each claim's probability of selection is known. If every claim has the same probability of selection from the universe it is known as an 'equal probability of selection' (EPS) design. Simple random samples are such designs. Such designs are also referred to as 'self-weighting' because all sampled units are given the same weight. Probability sampling includes: Simple Random Sampling, Systematic Sampling, Stratified Sampling, Probability Proportional to Size Sampling, and Cluster or Multistage Sampling.

Appendix A
Screens from RAT-STATS Programs

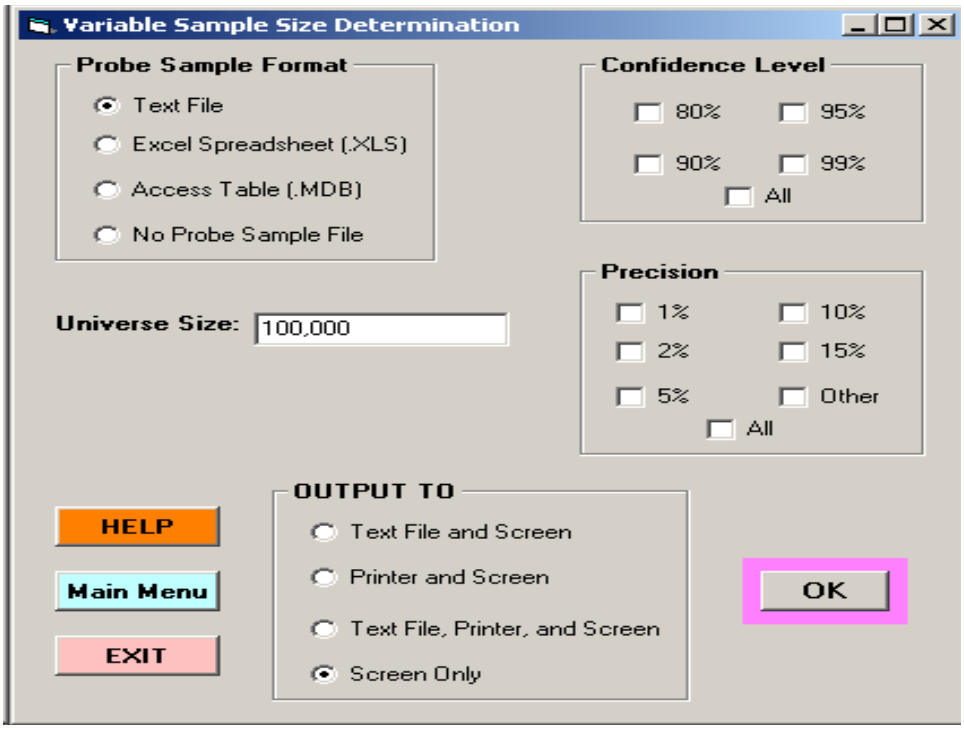
Screens from RAT-STATS 2007 v.2

I. Screen for information required to generate table of random numbers

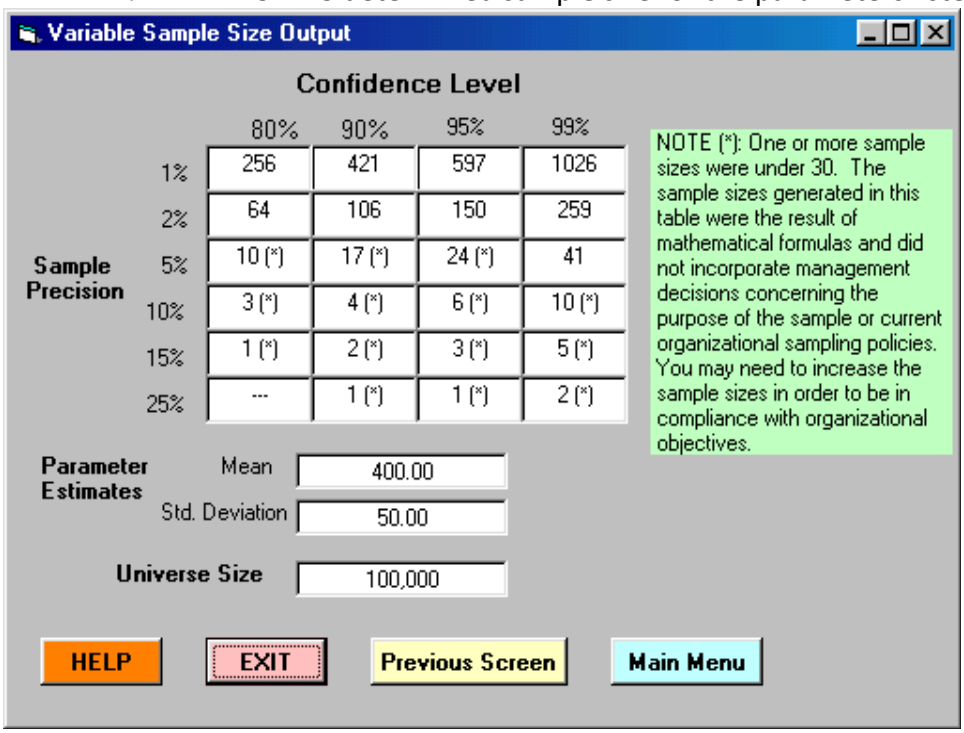


II. Screen for information required to determine sample size

Note the Confidence Level and Precision are selected before sample size is determined



III. RAT-STATS determined sample size for the parameters listed



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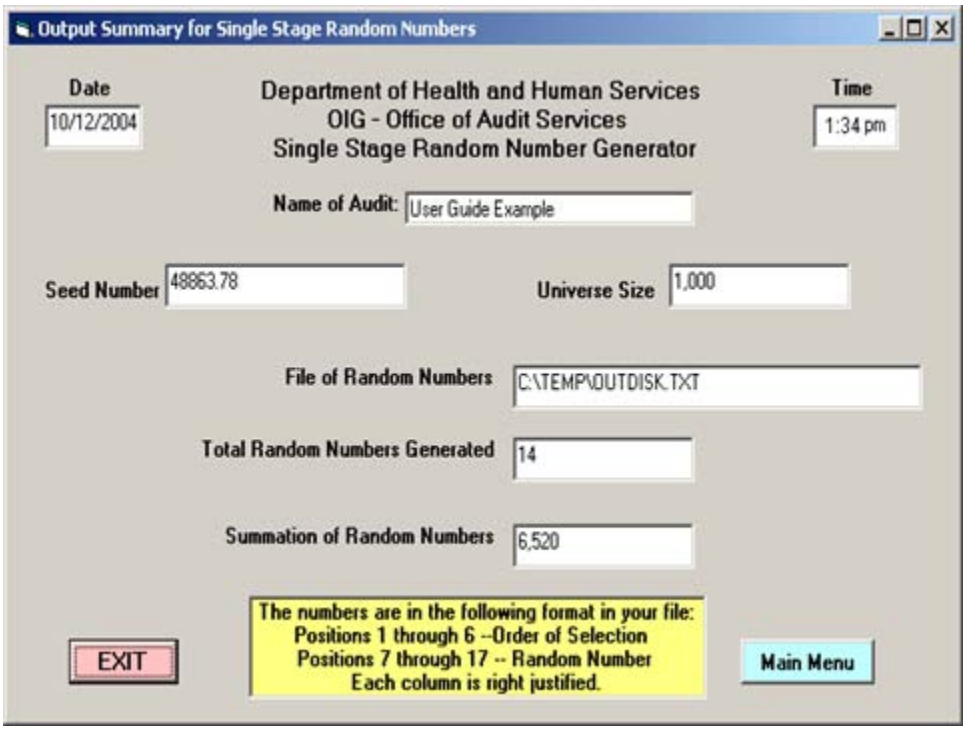

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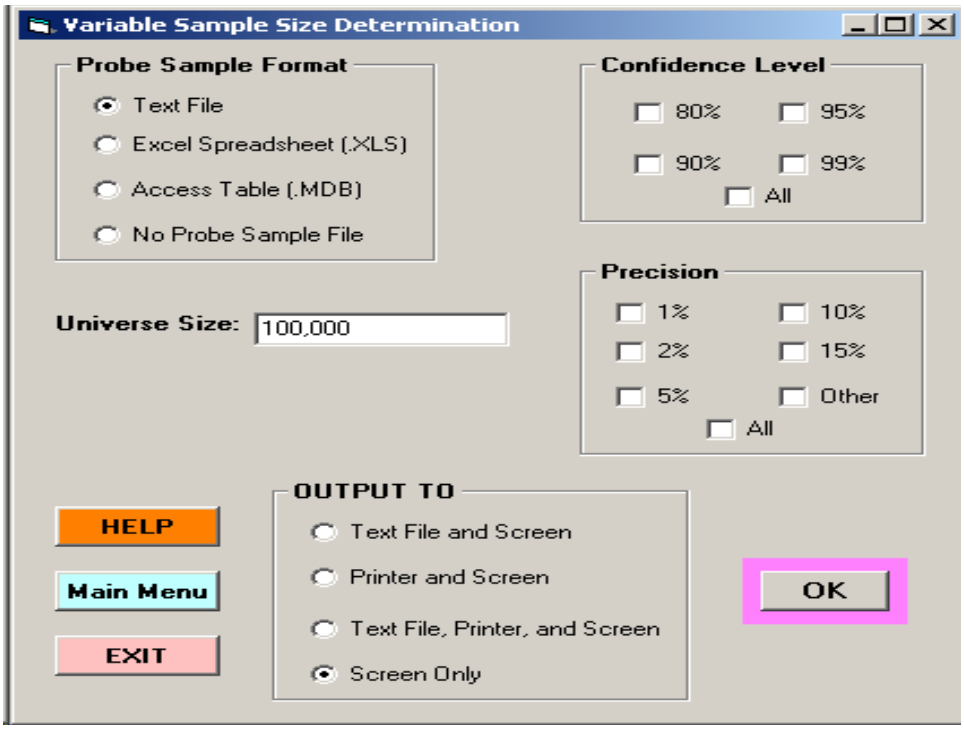

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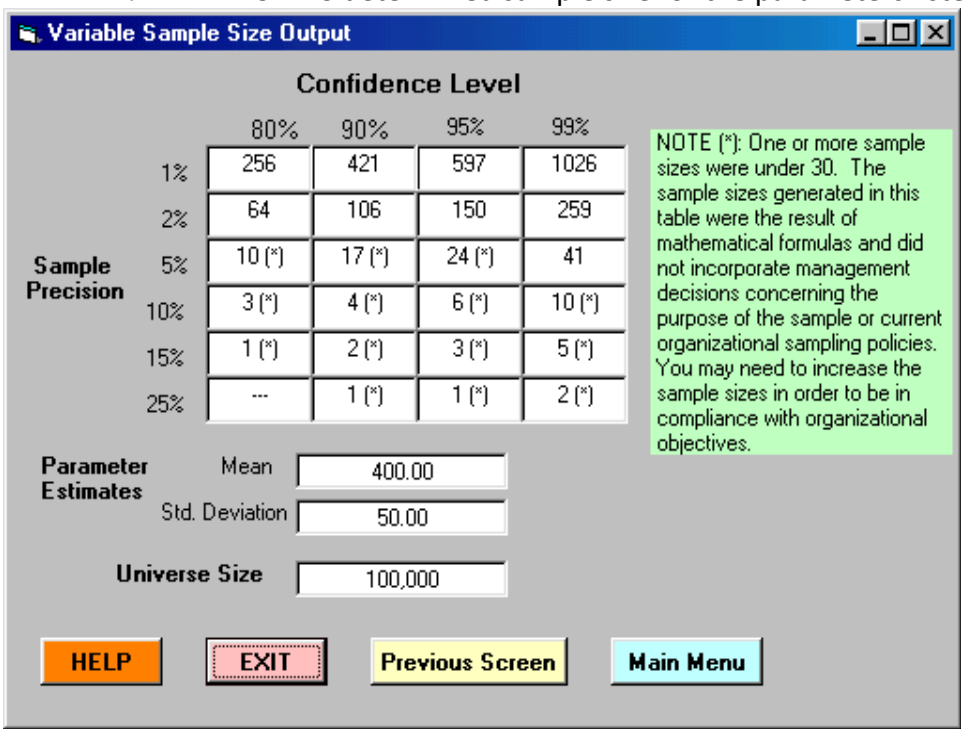

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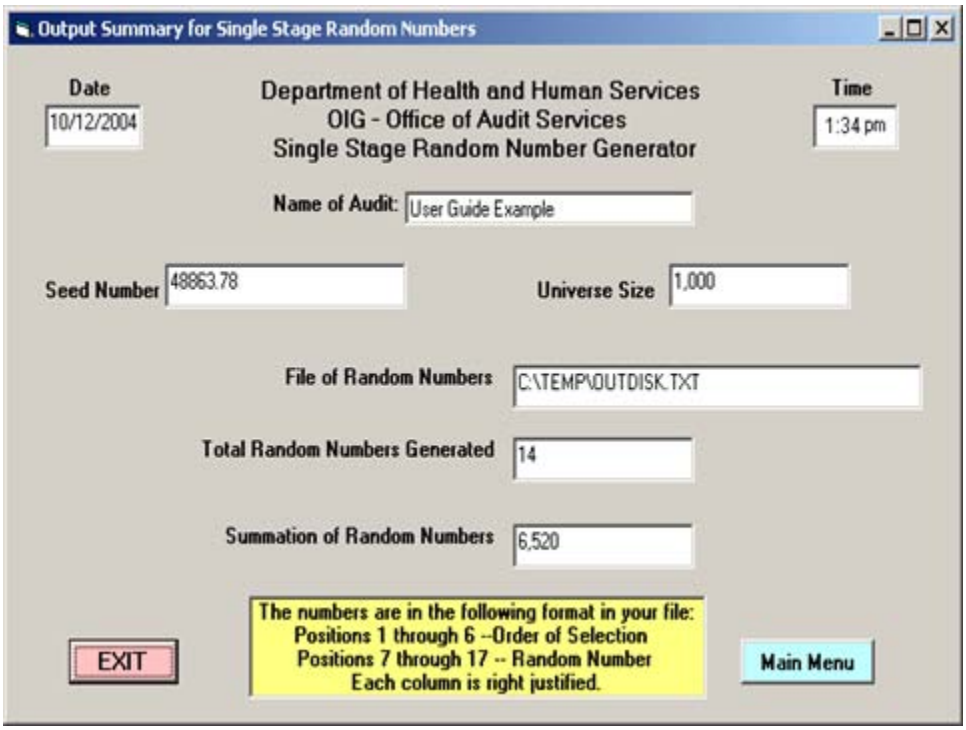

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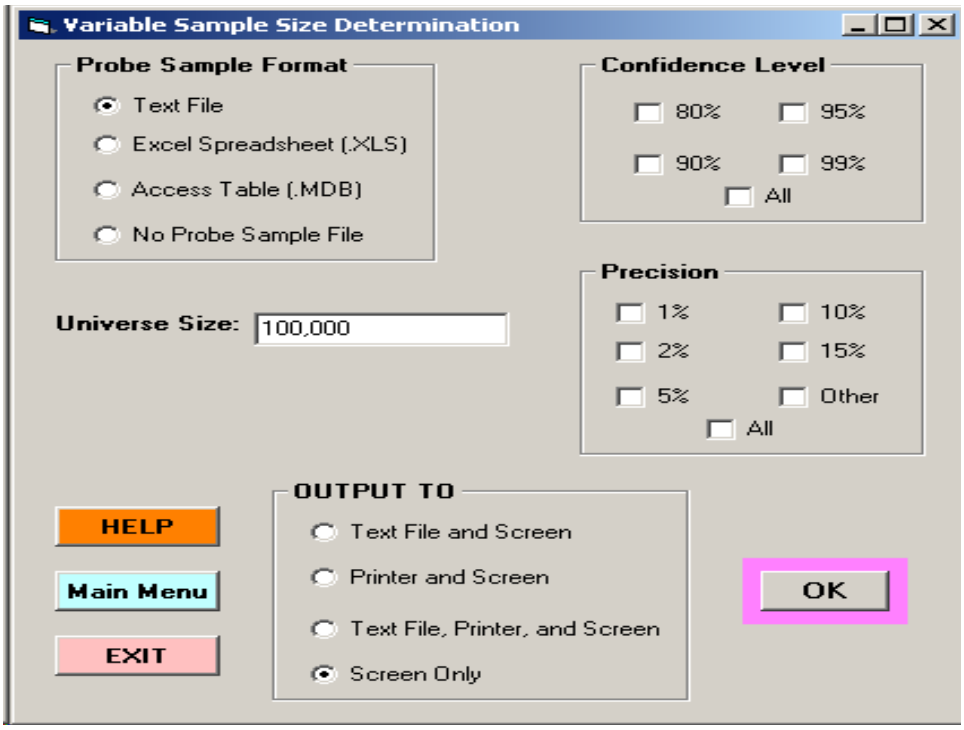

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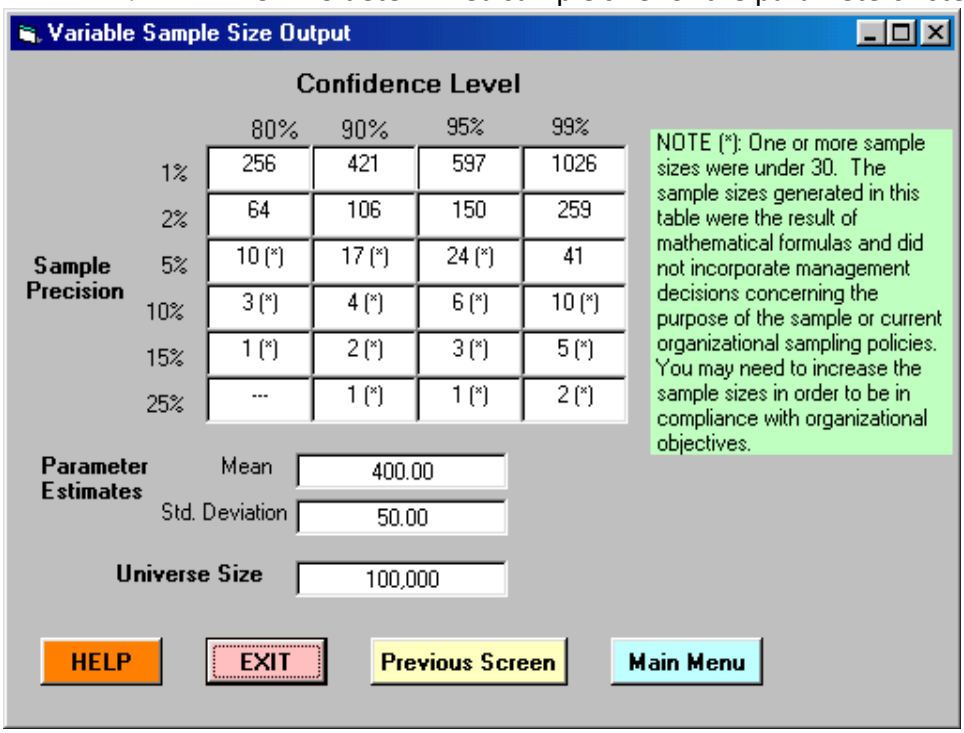

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Appendix B
Mock up for Webinar
RAT-STATS Sample Size Determination Output

This is an example of the type of information provided by RAT-STATS from the sample size determination program. The highlighted information gives a 10% precision and 90% confidence level for a stratified sample using the proportional allocation program. The output illustrates the 4 strata and sample sizes calculated for each stratum.

THE ESTIMATES ARE BASED ON THE FOLLOWING ENTRIES:

#	DESCRIPTION --	MEAN --	STD.DEV. --	-- UNIVERSE Size	-- RATIO --
1	<$150 Paid	76.37	43.97	8,882	45%
2	$150-$350 Paid	216.06	55.08	3,070	20%
3	$350-$600 Paid	482.87	91.72	1,370	15%
4	>$600 Paid	962.65	253.59	681	20%
- TOTALS -		189.87	227.17	14,003	

= =

Sample Sizes for **Stratum 1**: <$150 Paid

		Confidence Level			
		80%	90%	95%	99%
	1%	655	977	1261	1839
	2%	186	298	410	660
Precision	5%	31	51	72	123
Level	10%	8 (*)	13 (*)	19 (*)	32
	15%	4 (*)	6 (*)	9 (*)	14 (*)

Sample Sizes for **Stratum 2:** $150-$350 Paid

		Confidence Level			
		80%	90%	95%	99%
	1%	284	423	546	796
	2%	81	129	178	286
Precision	5%	14 (*)	22 (*)	31	53
Level	10%	4 (*)	6 (*)	8 (*)	14 (*)
	15%	2 (*)	3 (*)	4 (*)	7 (*)

Sample Sizes for **Stratum 3**: $350-$677 Paid

		Confidence Level			
		80%	90%	95%	99%
	1%	211	315	406	592
	2%	60	96	132	213
Precision	5%	10 (*)	17 (*)	24 (*)	40
Level	10%	3 (*)	5 (*)	6 (*)	11 (*)
	15%	2 (*)	2 (*)	3 (*)	5 (*)

Sample Sizes for **Stratum 4**: >$677 Paid

		Confidence Level			
		80%	90%	95%	99%
Precision Level	1%	290	432	558	681 (#)
	2%	83	132	182	292
	5%	14 (*)	23 (*)	32	54
	10%	4 (*)	6 (*)	9 (*)	14 (*)
	15%	2 (*)	3 (*)	4 (*)	7 (*)

Total Sample Sizes

		Confidence Level			
		80%	90%	95%	99%
Precision Level	1%	1440	2147	2771	3908
	2%	410	655	902	1451
	5%	69	113	159	270
	10%	19 (*)	30	42	71
	15%	10 (*)	14 (*)	20 (*)	33

NOTE (*): One or more sample sizes were under 30. The generated sample sizes were the result of mathematical formulas and did not incorporate management decisions concerning the purpose of the sample or current organizational sampling policies. You may need to increase the sample sizes in order to be in compliance with organizational objectives.

NOTE (#): The formulas calculated a sample size greater than the universe size. The program reduced the calculated sample size to the universe size. The additional sampling units were then distributed among the remaining strata based on optimal allocation formulas.

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Appendix B
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RAT-STATS Point Estimate Output

This example of the point estimate program output for a stratified random sample using proportional allocation. The point estimate for the overpayment estimate is given for the frame along with the Lower Level at 90% for a 2-tailed statistical test. Highlighted are the numbers generally found in overpayment demand letters

	TOTAL OF DIFF VALUES SAMPLE SIZE	NONZERO DIFFS	DIFFERENCE VALUES	TOTAL OF AUDITED VALUES
Strat1	30	16	$332.54	$1,095.50
Strat2	30	25	$2,412.38	$7,358.75
Strat3	30	22	$10,697.00	$27,393.24
Strat4	30	29	$39,125.25	$70,160.17
TOTAL	120	92	$52,567.17	$106,007.66

REPRESENTATIVENESS:

	FRAME AVG	SAMPLE AVG	SAMPLE SD	DIFFERENCE
	Strat1	$41.59	36.52	5.07
	Strat2	$236.33	245.29	8.96
	Strat3	$957.00	913.11	43.89
	Strat4	$2,458.35	2,338.67119.68	

	FRAME STDEV	SAMPLE STDEV	DIFFERENCE	
	Strat1	$26.86	25.90	0.96
	Strat2	$114.50	111.78	2.72
	Strat3	$194.99	164.85	30.14
	Strat4	$745.49	740.67	4.82

OVERALL:	Mock up	
OVERALL FRAME SIZE		15,336
OVERALL SAMPLE SIZE		120
NONZERO DIFFS		92
PROVIDER PAID ERROR RATE		49.59%
PERCENTAGE CLAIMS IN ERROR		76.67%
POINT ESTIMATE		**$2,097,931**
STANDARD ERROR		239,473.80
AVG OVERPAYMENT		136.80
	90% CONFIDENCE LEVEL	
LOWER LIMIT	**1,704,032**	
UPPER LIMIT	2,491,830	
PRECISION AMOUNT	393,899	
PRECISION PERCENT	18.78%	
RELATIVE SAMPLING ERROR		11.41%
Z-VALUE USED	1.644853626951	

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STRATUM 1: Mock up

FRAME 1 SIZE	7,290	
SAMPLE SIZE	30	
NONZERO DIFFS	16	
PERCENTAGE CLAIMS IN ERROR		53.33%
MEAN	11.08	
STANDARD DEVIATION	17.90	
STANDARD ERROR	3.26	
POINT ESTIMATE	80,807	
90% CONFIDENCE LEVEL		
LOWER LIMIT	40,410	
UPPER LIMIT	121,205	
PRECISION AMOUNT	40,398	
PRECISION PERCENT	49.99%	
RELATIVE SAMPLING ERROR		29.42%
T-VALUE USED	1.699127	

STRATUM 2: Mach up

FRAME 2 SIZE	5,490	
SAMPLE SIZE	30	
NONZERO DIFFS	25	
PERCENTAGE CLAIMS IN ERROR		83.33%
MEAN	80.41	
STANDARD DEVIATION	84.83	
STANDARD ERROR	15.45	
POINT ESTIMATE	441,466	
90% CONFIDENCE LEVEL		
LOWER LIMIT	297,389	
UPPER LIMIT	585,542	
PRECISION AMOUNT	144,076	
PRECISION PERCENT	32.64%	
RELATIVE SAMPLING ERROR		19.21%
T-VALUE USED	1.699127	

STRATUM 3: Mock up

FAME 3 SIZE	1,855	
SAMPLE SIZE	30	
NONZERO DIFFS	22	
PERCENTAGE CLAIMS IN ERROR		73.33%
MEAN	356.57	
STANDARD DEVIATION	456.14	
STANDARD ERROR	82.60	
POINT ESTIMATE	661,431	
90% CONFIDENCE LEVEL		
LOWER LIMIT	401,074	
UPPER LIMIT	921,789	
PRECISION AMOUNT	260,358	
PRECISION PERCENT	39.36%	
RELATIVE SAMPLING ERROR		23.17%
T-VALUE USED	1.699127	

STRATUM 4: Mock up

FRAME 4 SIZE	701

SAMPLE SIZE	30
NONZERO DIFFS	29
PERCENTAGE CLAIMS IN ERROR	96.67%
MEAN	1,304.18
STANDARD DEVIATION	1,290.53
STANDARD ERROR	230.52
POINT ESTIMATE	914,227
90% CONFIDENCE LEVEL	
LOWER LIMIT	639,657
UPPER LIMIT	1,188,797
PRECISION AMOUNT	274,570
PRECISION PERCENT	30.03%
RELATIVE SAMPLING ERROR	17.68%
T-VALUE USED	1.699127

Appendix C

Ethical Guidelines for Statistical Practice

American Statistical Association

http://www.amstat.org/about/ethicalguidelines.cfm

Worth a look and consideration when criticizing obviously problematic audit execution and conclusions.