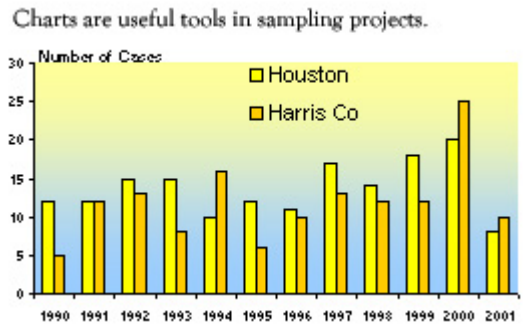
Survey Sample Size Determination

Introduction
Choosing the sample size is a problem faced by anyone doing a survey of any type. What sample size do I need?' is one of the most frequently asked questions to statisticians. The usual response to this question always starts with 'It depends on…'. In this technical note what it depends on is summarized along with the steps needed to reach a decision.

When choosing a sample size, we must consider the following issues:

Objective: Define clearly the survey objectives. Most surveys have multiple objectives that may require different sample sizes.



Cost of taking samples: The cost of sampling will help us determine how precise our estimates should be. Increasing the sample size will increase costs in the field (transport, survey personnel, time) and afterwards (coding, data entry etc.). Consequently, choosing a sample size involves balancing all these factors.

Prior Information: If there have been previous similar surveys, we would want to use prior information to reduce sample sizes. This can be done by using prior means and variance estimates and by stratifying the population to reduce variation within groups. If you are stratifying the population, remember that the sample size must be performed for each stratum.

Inherent Variability: The essence of sampling is to form estimates of some characteristic of the population of interest. The variance of that estimate is proportional to the inherent variability of the population divided by the sample size. This means that if the variability of the population is large, then we must take many samples. On the other hand, if the variability of the population is small then we do not have to take as many samples.

Practicality: The final sample size you select must make sense. This is where the trade-offs usually occur. We want to take enough observations to obtain reasonably precise estimates of the parameters of interest but we usually need to do this within a limited budget. The important thing is to quantify the risks associated with the chosen sample size.

Conclusion: In order to make rational sample size choices all the above factors has to be considered. Both the quantities to be estimated and the precision required must be specified at the planning phase. If the cost of the required sample is too high, refine the objectives of the survey. But we must keep in mind that there is no benefit reducing the sample size to match available resources as objectives will not be met.

For additional information, contact the Bureau of Epidemiology at 713-794-9181.

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