

Selection of samples

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Sampling of units for forensic analysis is a big task for the particular analyst involved. Batches of seized material can often be very large; for drug pills they may be in forms of plastic sacs each with thousands of pills. Limits of both time and money would give that a realistic sample to be analyzed cannot consist of more than 10-20 units. Traditional methods for sampling and sample size determination might therefore not be applicable, as they would tend to give sample sizes far above 20 units. To overcome this problem you need to combine mathematical models for variation within a seizure with manual inspection of the units and experience from similar historical cases. There is a great distinction between sampling of seized units (drug units, banknotes, coins) and sampling of society units (human beings, households, etc.). In the former, the whole population comes in a batch and can be considered as a whole. In addition, you would expect a high degree of homogeneity among the units. In the latter, you seldom have control of the whole population, but a frame is available, and there is, for natural reasons, usually a high degree of heterogeneity among the units.

If homogeneity can be concluded, there are powerful tools (Aitken, 1999) that make use of a Bayesian approach to the sampling problem. Prior assumptions of a large amount of illegal units in a seizure can reduce the sample sizes down to as low figures as five units, while the inference from such samples can provide satisfactory statements about the proportion of illegal units in the seizure. The keys to the problem are (i) to state homogeneity and (ii) to find arguments for necessary prior assumptions. In this talk we will give an overview of the sampling theory and examples from a few number of forensic applications as to how to deal with the keys (i) and (ii) above.

Aitken C.G.G. (1999) Sampling-How big a sample? *Journal of Forensic Science* **44**, 750-760.

Nordgaard, A. (2006) Quantifying experience in sample size determination for drug analysis of seized drugs. *Law, Probability and Risk* **4**: 217-225.