# Unit 2: Learning Objectives

* PCM2a
* Understand the importance of randomness in good sampling techniques
* Introduce stratified sampling to ensure representativeness from heterogeneous populations
* Discuss use of voluntary and convenience samples and their impact on inference
* Numerically and graphically summarize categorical variables
* Introduce standard error to account for variability in difference of two sample proportions
* PCM2b
* Simulate sampling distributions for proportions and difference of proportions
* Use central limit theorem to approximate sampling distribution for sampling proportions
* Define discrete and continuous random variables
* Discuss Bernoulli and binomial random variables and the binomial PMF
* Use CLT to approximate distribution of a binomial random variable
* Introduce normal distribution and standard normal distribution
* Calculate expected value and variance for random variables and their linear transformations
* PCM2c
* Calculate confidence intervals for difference of sample proportions and interpret them
* Discuss the assumptions needed for validity of confidence intervals for proportions and difference of proportions
* Derive the confidence interval formula using the idea of z-scores and standard normal quantiles
* Apply confidence intervals to compare different groups in context of the problem