

## Population Parameters and Sample Statistics

In inferential statistics, the focus is on learning about populations. Examples of populations are all people with a certain disease, all drivers with a certain level of insurance, or all customers, both current and potential, at a bank.

Parameters are evaluations of characteristics of populations. They are generally unknown and must be estimated through the use of samples.

A sample is a group of measurements from a population. In order for inferences to be valid, the sample should be representative of the population. A sample statistic is a measurement from our sample. You infer information about population parameters through the use of sample statistics.

A point estimate is a single, best estimate of a population parameter.

Statisticians use Greek letters to represent population parameters (for example,  $\mu$ ,  $\sigma$ , and  $\rho$ ) and letters from the English alphabet to represent sample statistics (for example,  $\bar{x}$ ,  $r$ , and  $s$ ). You can use  $\bar{x}$ , the sample mean, to estimate  $\mu$ , the population mean. Similarly, you can use  $s$ , the sample standard deviation, to estimate  $\sigma$ , the population standard deviation.

In this course, our population of interest is all homes in Ames, Iowa. Unfortunately, we can't measure the attributes of each home, so we infer real estate attributes for the region with a sample. We sampled 300 homes sold between 2006 and 2010 and found that the average sale price in our sample is \$137,525, the standard deviation is \$37,623, and the standard error is \$2,172. These values are referred to as point estimates.

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### *Statistics 1: Introduction to ANOVA, Regression, and Logistic Regression*

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