

## 5.1: The Normal Curve, z-Scores, and Probability

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As we have reviewed in the prior two chapters, the mean and standard deviation are, together, often the foundation used to summarize and describe a quantitative variable. In this unit, we will build on our knowledge of the mean and standard deviation by exploring how they relate to a graph known as the normal distribution curve. We will also learn how z-scores are computed using means and standard deviations and how they describe the positions and probabilities of raw scores on the normal distribution curve.

Descriptive statistics such as the mode, median, mean, and standard deviation are associated with probabilities. This is because these four descriptive measures exist in meaningful places on something known as the normal distribution curve (see Figure 1). The normal distribution curve is also sometimes referred to as the normal curve for short, as the bell curve due to its bell-like shape, or as the Gaussian distribution named for a scientist and mathematician who wrote using the concepts of the distribution to describe patterns of measurement error. We can use our knowledge about these descriptive statistics and the curve to better understand our sample data and to begin to make inferences about the populations they represent.

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