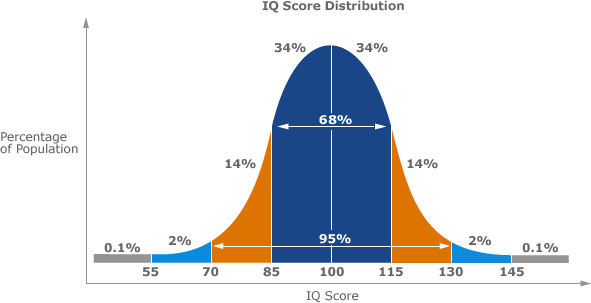
## **Statistics Overview**

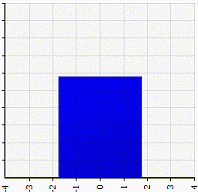
Statistics is the discipline that concerns the collection, organization, displaying, analysis, interpretation and presentation of data. In applying statistics to a scientific, industrial, or social problem, it is conventional to begin with a [statistical population](https://en.wikipedia.org/wiki/Statistical_population) or a [statistical model](https://en.wikipedia.org/wiki/Statistical_model) to be studied. Populations can be diverse groups of people or objects such as "all people living in a country" or "every atom composing a crystal". Statistics deals with every aspect of data, including the planning of data collection in terms of the design of [surveys](https://en.wikipedia.org/wiki/Statistical_survey) and [experiments](https://en.wikipedia.org/wiki/Experimental_design)

The most common basic statistics terms you’ll come across are the [mean, mode and median](https://www.statisticshowto.datasciencecentral.com/probability-and-statistics/statistics-definitions/mean-median-mode/). These are all what are known as “Measures of [Central Tendency](https://www.statisticshowto.datasciencecentral.com/central-tendency-2/).” Also important in this early chapter of statistics is the [shape of a distribution](https://www.statisticshowto.datasciencecentral.com/shapes-of-distributions/). This tells us something about how data is spread out around the [mean](https://www.statisticshowto.datasciencecentral.com/mean) or [median](https://www.statisticshowto.datasciencecentral.com/median). Perhaps the most common distribution you’ll see is the [**normal distribution**](https://www.statisticshowto.datasciencecentral.com/probability-and-statistics/normal-distributions/), sometimes called a bell curve. Heights, weights, and many other things found in nature tend to be shaped like this:



*IQ scores fit a bell curve shape.*

On the other end of the scale, you can also get a **flat distribution**. With this shape, the odds of anything happening are equal. For example, a [uniform distribution](https://www.statisticshowto.datasciencecentral.com/uniform-distribution/) can represent choosing a particular card from a standard deck; all the cards have a 1/52 chance of being chosen. Or tossing a coin, where you have a 50% chance of tossing a heads or a tails.

[](https://www.statisticshowto.datasciencecentral.com/wp-content/uploads/2014/02/shape_uniform.gif)

*A uniform distribution.*

**Type of Statistics:**

1. Descriptive Statistics
2. Inferential statistics

## **Descriptive Statistics**

Descriptive statistics are one of the fundamental “must knows” with any set of data. It gives you a general idea of trends in your data including:

* The [mean, mode, median](https://www.statisticshowto.datasciencecentral.com/probability-and-statistics/statistics-definitions/mean-median-mode/) and [range](https://www.statisticshowto.datasciencecentral.com/probability-and-statistics/statistics-definitions/range-statistics/).
* [Variance](https://www.statisticshowto.datasciencecentral.com/probability-and-statistics/variance/)and [standard deviation](https://www.statisticshowto.datasciencecentral.com/probability-and-statistics/standard-deviation/).
* [Skewness](https://www.statisticshowto.datasciencecentral.com/skewness/).
* Count, maximum and minimum.

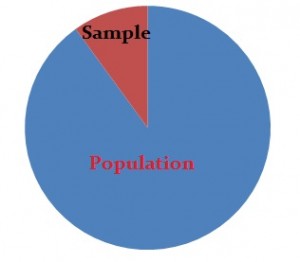
Descriptive statistics is useful because it allows you to take a large amount of data and summarize it. For example, let’s say you had data on the incomes of one million people. No one is going to want to read a million pieces of data; if they did, they wouldn’t be able to glean any useful information from it. On the other hand, if you summarize it, it becomes useful: an average wage, or a median income, is much easier to understand than reams of data.

## **Sub-Areas**

Descriptive statistics can be further broken down into several sub-areas, like:

* Measures of [central tendency.](https://www.statisticshowto.datasciencecentral.com/central-tendency-2/)
* [measures of dispersion](https://www.statisticshowto.datasciencecentral.com/dispersion/).
* Charts & graphs.
* [Shapes of Distributions.](https://www.statisticshowto.datasciencecentral.com/shapes-of-distributions/)

## **Inferential Statistics**



[Descriptive statistics](https://www.statisticshowto.datasciencecentral.com/probability-and-statistics/descriptive-statistics/) describes data (for example, a chart or graph) and **inferential statistics** allows you to make predictions (“inferences”) from that data. With inferential statistics, you take data from [samples](https://www.statisticshowto.datasciencecentral.com/sample/)and make generalizations about a [population](https://www.statisticshowto.datasciencecentral.com/what-is-a-population/). For example, you might stand in a mall and ask a sample of 100 people if they like shopping at [Sears](http://www.sears.com/). You could make a [bar chart](https://www.statisticshowto.datasciencecentral.com/probability-and-statistics/descriptive-statistics/bar-chart-bar-graph-examples/) of yes or no answers (that would be [descriptive statistics](https://www.statisticshowto.datasciencecentral.com/probability-and-statistics/descriptive-statistics/)) or you could use your research (and inferential statistics) to reason that around 75-80% of the population (**all**shoppers in **all malls**) like shopping at Sears.

There are two main areas of inferential statistics:

1. **Estimating parameters**. This means taking a [statistic](https://www.statisticshowto.datasciencecentral.com/statistic/)from your sample data (for example the [sample mean](https://www.statisticshowto.datasciencecentral.com/sample-mean/)) and using it to say something about a population parameter (i.e. the population mean).
2. **[Hypothesis tests](https://www.statisticshowto.datasciencecentral.com/probability-and-statistics/hypothesis-testing/)**. This is where you can use sample data to answer research questions. For example, you might be interested in knowing if a new cancer drug is effective. Or if breakfast helps children perform better in schools.

References:

1. <https://www.statisticshowto.datasciencecentral.com/statistics-basics/>
2. <https://stattrek.com/tutorials/ap-statistics-tutorial.aspx>