

# Disclaimer

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# Chapter 1

## WHAT IS STATISTICS?



## WHAT IS STATISTICS?

### An Introduction into the Wonderful World of Statistics

#### Student Learning Outcomes

By the end of the chapter,

1. You will understand applications of statistics.
2. You will define statistics.
3. You will differentiate between descriptive and inferential statistics.

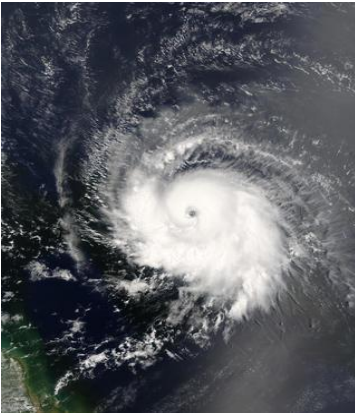


In everyday life, you may have read, seen, or heard one or more of the following:

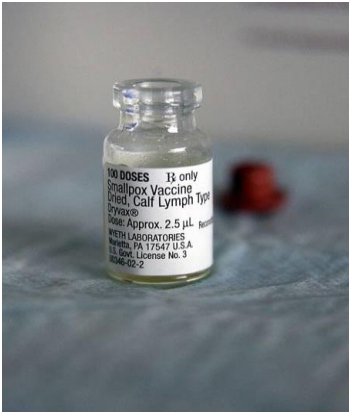
- FIRST RESPONSE® Early Result Pregnancy Test is over 99% effective.
- There is a 60% chance of rain on Sunday.
- The median price of a home in Miami, FL was \$250,000 in Jan. 2009.
- The odds of winning the Powerball are 1:80,089,128.
- Smoking increases a person's risk of getting lung cancer.

These statements were made based on the use of statistics. Statistics is used daily and is pretty much everywhere! Many are unaware that statistics is used in many fields and applications.

Statistics is used to determine the path of hurricanes.



Statistics is used in medicine and pharmaceutical companies.



Statistics is used in government such as the Department of Labor and Statistics as well as the National Institutes of Health.



Statistics is used to determine insurance rates.



Statistics is also used in studies, polls, education, psychology, politics, law enforcement agencies and science, to name a few.

So, *technically*, what is statistics?

### DEFINITION

**Statistics:** a branch of mathematics which involves collecting, organizing, summarizing and analyzing data. It also involves drawing conclusions, making predictions from sample data and inferring sample results to the population.

The definition of statistics can be broken down into two main branches:



**DEFINITION**

**Descriptive statistics:** a branch of statistics that includes collecting, organizing and summarizing data.

**Inferential statistics:** a branch of statistics that includes analyzing data. It also involves drawing conclusions and/or making predictions from sample data to the population using probability.

Throughout the book, you will learn about both branches of statistics. Descriptive statistics requires researchers to describe data using tables, graphs and numerical summaries (e.g. means, percentages). Inferential statistics requires researchers to draw conclusions about the population using sample information.

In addition to learning about both branches of statistics, you will also learn how statistics can be used to make informed decisions.

For example,

- I. Suppose a high school principal was interested in determining whether her school's dropout rate was higher than the state's average. Using statistics, she would determine if there was a significant increase. If there was indeed a statistically significant increase, she could make decisions about implementing new programs to help retain the students.
- II. In a local town, doctors have been noticing an increase in births from teenage mothers. Is this a random occurrence or is there a statistically significant increase from previous years? To address the question, doctors could perform a statistical analysis to determine if there is a significant increase in birth rates for teenage mothers. If there is a statistical significance shown, then doctors along with the city's department of health



may implement programs or courses to discuss ways to prevent pregnancy and discuss safe sex practices.

- III. People tend to travel more in the summer months than during other times of the year. Knowing this, an amusement park could use statistics to predict how many more people should be hired during the summer months to handle the influx of customers.

So, let's begin our journey into the

Wonderful World of Statistics...

