Statistical Inference

Descriptive statistics is concerned with summarizing data collected from past events.

We now turn to the second facet of statistics, namely, *computing the chance that something will occur in the future.* This facet of statistics is called **statistical inference**.

It is rare that a decision maker might have all the information needed to make a good decision.

Earliest contribution to the foundation of probability is by Gerolamo Cardano (1501-1576), Italian mathematician, *Book of Games of Chances*, (1564).

Statistical Inference and Probability

Statistical inference deals with conclusions about a population based on a sample taken from that population.

Because there is uncertainty in decision making, it is important that all the known risks involved be scientifically evaluated.

Helpful in this evaluation is *probability theory*, which has often been referred to as the *science of uncertainty*.

Probability theory allows the decision maker with limited information to analyze the risks and benefits associated with a set of decision alternatives.

Hence, why probability concepts are so important to statistical inference.

Probability

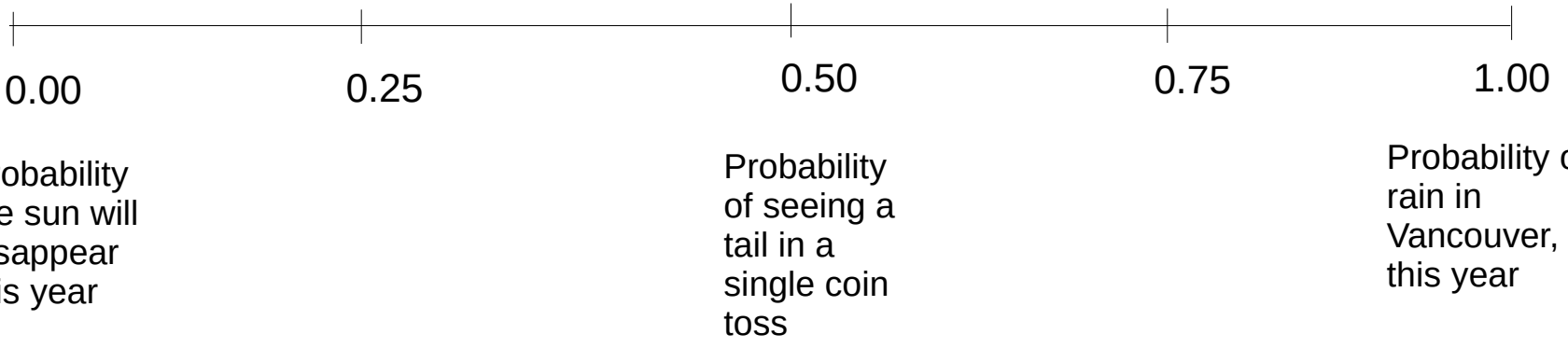
A **probability** is a measure of the likelihood that an event in the future will happen.

It can only assume a value between 0 and 1.

A value near 0 means the event is not likely to happen.

A value near 1 means it is likely to happen.

Other synonymous words include: chance, odds, likelihood...



Some Key Words

In probability, an **experiment** is a process that leads to the occurrence of one of several possible observations

An **outcome** is a particular result of an experiment

An **event** is a collection of one or more outcomes of an experiment

The **sample space** describes all the possible outcomes

A **certain event** is one that is certain to occur

An **impossible event** is one that can never occur

Example of Three Key Words

	
Experiment	Roll a die
All possible outcomes	Observe a 1 Observe a 2 Observe a 3 Observe a 4 Observe a 5 Observe a 6
Some possible events	Observe an even number Observe a number greater than 4 Observe a number 3 or less