

### Benefits:

- Tells a more complete story of underlying sample
- Illustrates uncertainty and precision of sample estimate
- Wide area of application to any sampled metric using the same core idea

---

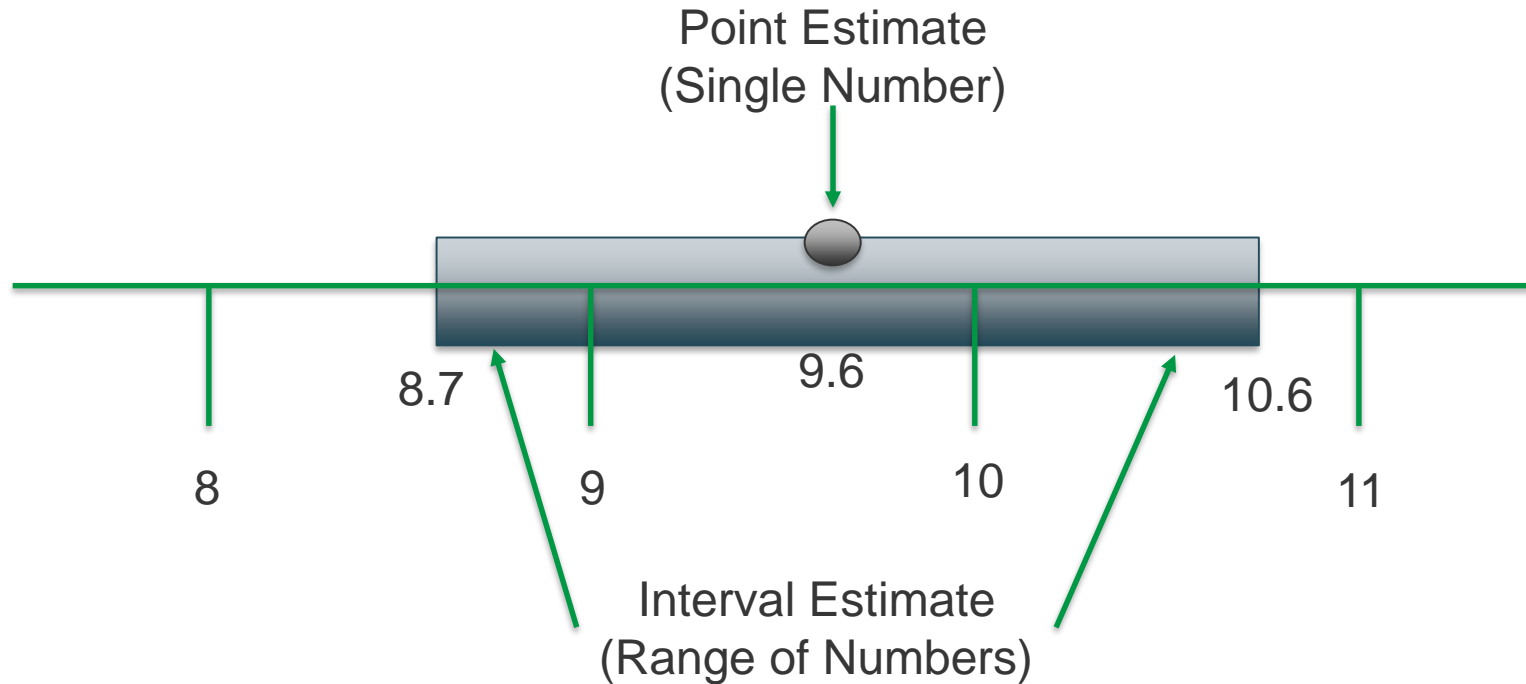
The many definitions of Confidence Intervals:

An **interval estimate** combined with a **probability** statement

**Interval estimate**, computed from the statistics of the observed data, that might contain the true value of an unknown population parameter. The interval has an associated confidence level that quantifies the **level of confidence** that the parameter lies in the interval.

A **range of values** so defined that there is a **specified probability** that the value of a parameter lies within it

*Point Estimate – Singular Value for an estimate of a population parameter*



*Interval Estimate – Range of values that potentially contain the population parameter*

*Precision - Measures **variability** in responses from measurement to measurement within an individual sample*

*Uncertainty - Measures **variation** in responses from sample to sample*

---

## Understanding Probability Statements

### *90% Confidence Interval Meaning*

*We expect that 90% of the intervals computed using the same sample collection techniques to contain the population parameter in question*

*General Formula*

*Point Estimate  $\pm$  MOE*

*Confidence Interval for normally distributed mean*

$$\bar{X} \pm Z^* * \frac{S}{\sqrt{N}}$$