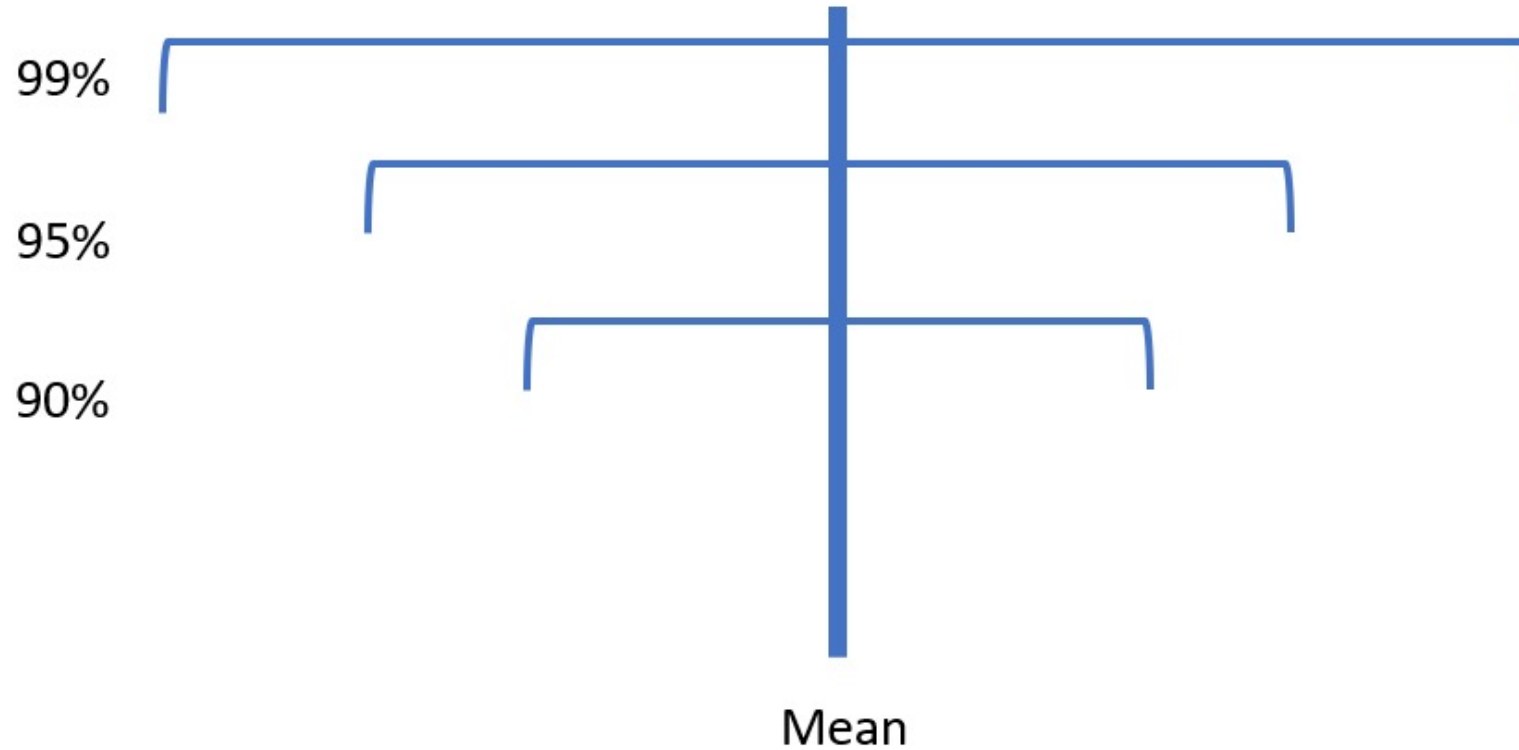# Be Confident! Confidence Intervals

What is a Confidence Interval?

- A range of numbers that you're reasonably certain contains the mean

- Abbreviated CI

Confidence Interval Percentages

- Typical ones are:
  - 99% CI
  - 95% CI
  - 90% CI

- But theoretically it could be any percentage

- The larger the number, the more certain you are

The Larger the Number, the More Certainty!

Margin of Error

- No one and nothing is perfect!

- How much you might be wrong by

- Abbreviated MOE

Calculating Margin of Error

• CV = critical value
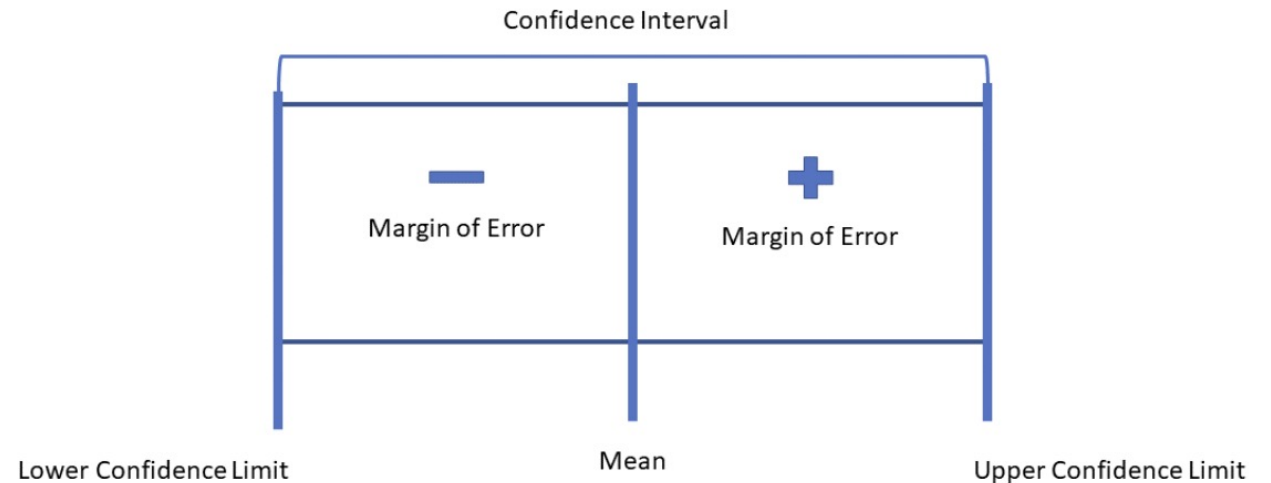
• s = standard deviation

• n = sample size

$$margin\ of\ error = CV * \frac{s}{\sqrt{n}}$$

Critical Values

Confidence Level	Critical Value
90%	1.645
95%	1.96
99%	2.575

Calculating Confidence Intervals

- Place the margin of error on either side of the mean to create the confidence interval

An Example

What is the 95% CI for....

- Distribution with...

  - Mean of 7
  - Standard deviation of 1
  - Sample size of 200

Steps

1) Find the CV from the table: 1.96

2) Plug 'n play!

MOE = 1.96 x (1/ $\sqrt{200}$)

MOE = 1.96 x (1/14.14)

MOE = 1.96 x .07

MOE = .139

Steps

- 3) Get the lower confidence limit
  - Mean – MOE
  - 7-.14 = 6.86

- 4) Get the upper confidence limit
  - Mean + MOE
  - 7 + .14 = 7.14

- The 95% CI is: 6.86-7.14

Questions?