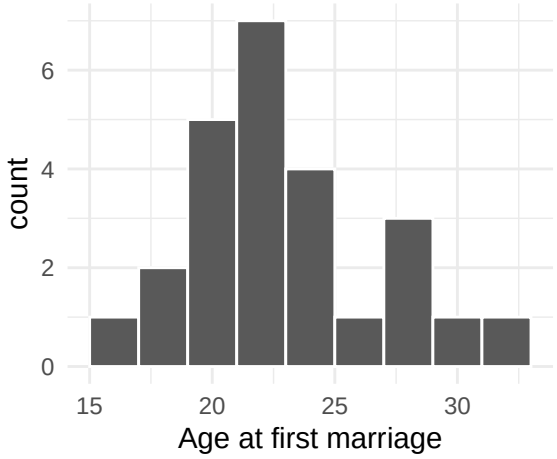
CI and HT for single mean via CLT

Confidence interval for single mean

Age at marriage (part 1)

In 2006-2010, the CDC conducted a thorough survey asking US women their age at first marriage. Suppose it is known that the standard deviation of the ages at first marriage is 5 years. Suppose we randomly sample 25 US women and ask them their age at first marriage (plotted below). Their average age at marriage was 23.32.



Obtain an 80% confidence interval for the mean age of US women at first marriage (not using simulation).

Check conditions for CLT:

What does CLT tell us?

If conditions for CLT met, proceed to construct interval:

- Point estimate:

- Standard error:

- Critical value (write code/draw picture):

Confidence interval:

Age at marriage (part 2)

Now suppose we don't know the population standard deviation, so all we have access to is the sample standard deviation of 4.03.

Obtain an 80% confidence interval for the mean age of US women at first marriage (not using simulation).

Note: conditions are still met.

Proceed to construct interval:

- Point estimate:

- Standard error:

- Critical value (write code/draw picture):

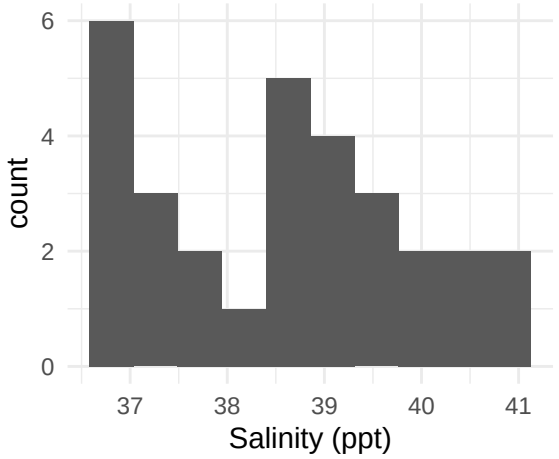
Confidence interval:

Hypothesis test for single mean

Salinity example

We have 30 salinity level measurements (ppt) collected from a random sample of water masses in the Bimini Lagoon, Bahamas (see below).

We want to test if the average salinity level in Bimini Lagoon is different from 38 ppm at the $\alpha = 0.05$ level.



1. Set hypotheses

2. Collect/summarise data, set α

3. Obtain null distribution, test statistic, and p-value

- Check conditions for CLT:

- Can we proceed with CLT-based method?

- Null distribution:

- Test-statistic:

- Distribution of test-statistic:

- p-value: draw picture and write code to obtain p-value

4. Make decision and conclusion in context.